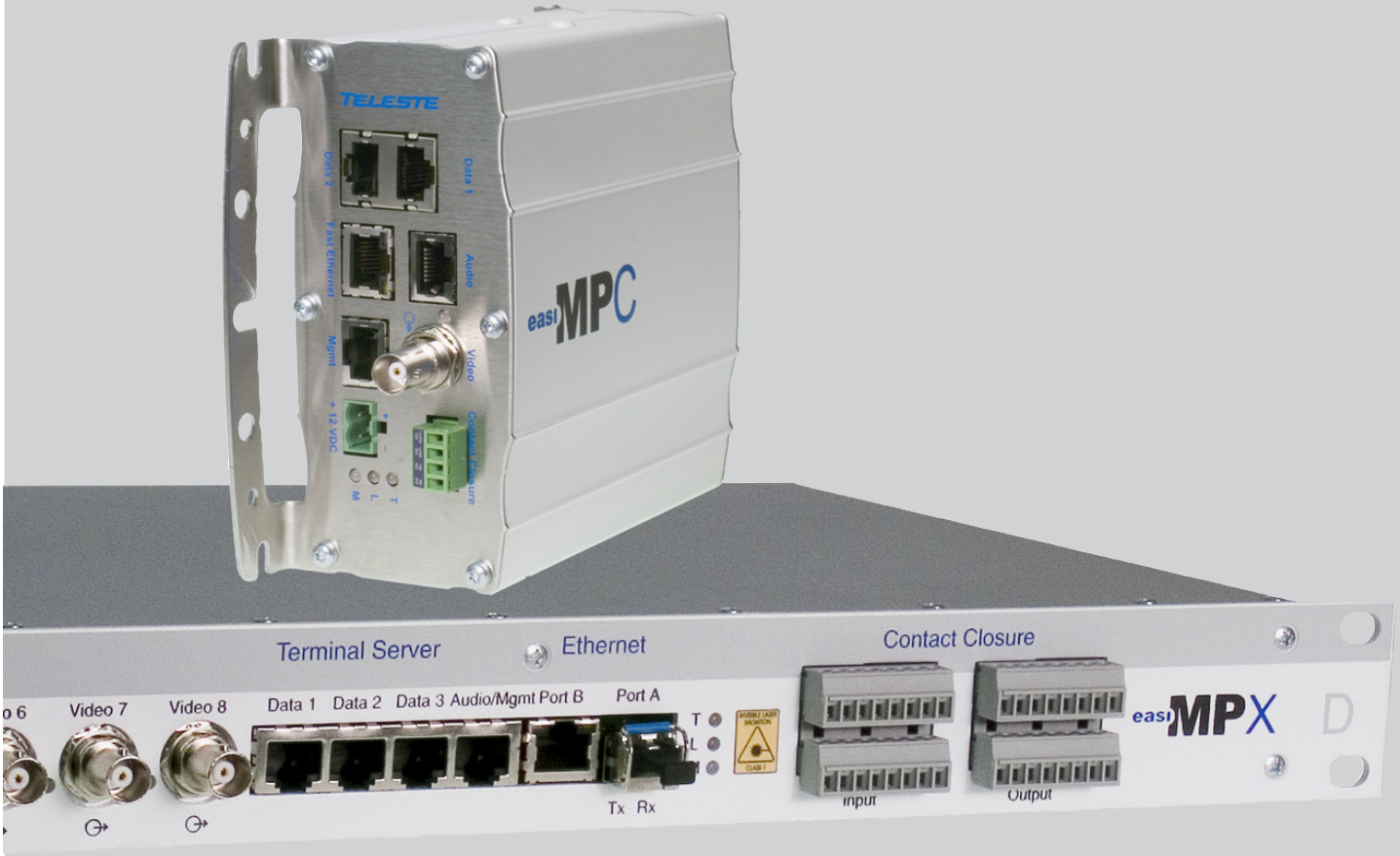
User manual

MPX series video decoders

MPEG-4 / MJPEG / MPEG-2 video decoders
for video networking applications



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MPX Series Video Decoders Introduction

Stand-alone video decoder with 1/2/4/8 video outputs, bi-directional data, audio and contact closure channels

General

Many similarities exist between the **MPC-D1**, **MPC-D2**, **MPC-D4** and **MPX-D8**; the main difference being the number of video channels available and the mechanics. **MPX** series video decoders are a high performance, stand-alone, temperature-hardened network video processing products decoding real time video in mission critical applications for customers in Transportation, City Center Monitoring, Corporate Security or any other installation requiring high quality video networking. **MPC** is a common nominator for compact size stand-alone video processing products in the **MPX** platform. **MPX-D8** is a common nominator for 1U high/19” wide size stand-alone video processing products in the **MPX** platform.

MPX series video decoders provides in addition to transparent link of PAL or NTSC video signal, bi-directional audio, independently configurable general-purpose bi-directional asynchronous data and optional bi-directional contact closure channels.

MPX series video decoders support decoding of industry standard video streams, **MPEG-4, MJPEG** and **MPEG-2**. The transmission is accomplished over 10/100Base-Tx or 100Base-Fx network utilizing IP/Ethernet streaming.

MPX series video decoders are equipped with the **MPEG-4** video decoding engine compliant with the ISO/IEC14496-2 (MPEG-4@SP L5) simple profile standard. The **MJPEG** video decoding engine is compliant with the ISO/IEC 13818-2 standard. The **MPEG-2** video decoding engine is compliant with the ISO/IEC13818 (MPEG-2 MP@ML) standard. **Audio** is decoded according to the **u-law ITU G.711** standard.

General-purpose asynchronous data channels are transferred separately from the decoded video and audio signals.

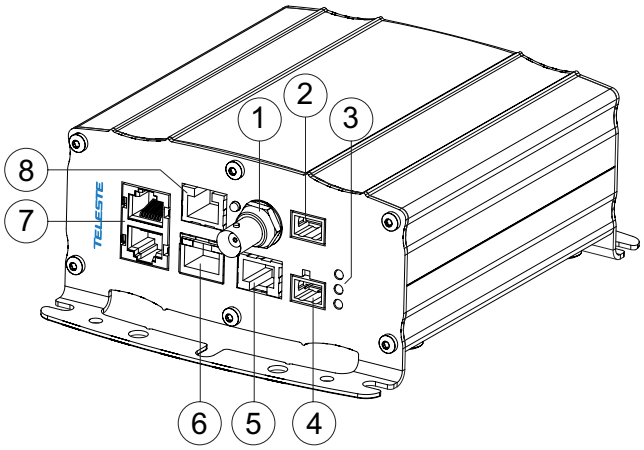
Firmware version

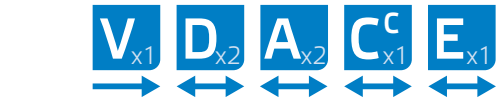
The functionality and operation of the devices described in this manual applies for firmware version **4.3.*.**

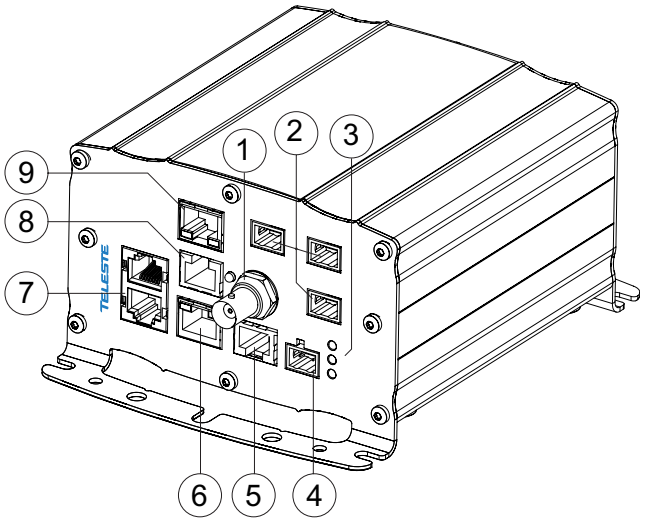
> ***Note!*** *It is highly recommended to use the same firmware versions in both encoder and decoder to ensure that all features are supported by both devices (e.g. encoder 4.3.x and decoder 4.3.x).*

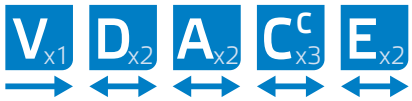
MPC Series Video Decoders Front Panel

MPC-D1 combinations

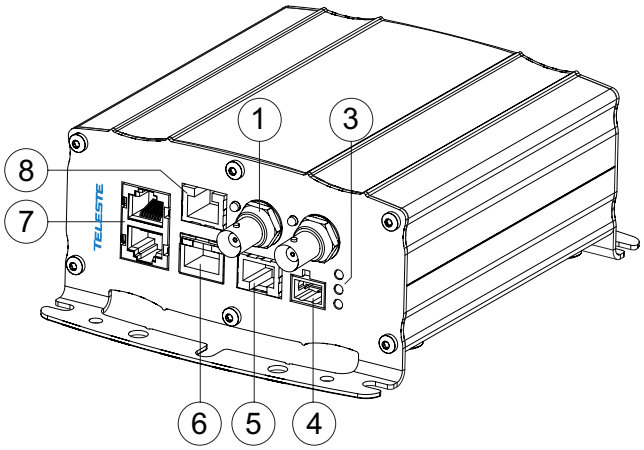


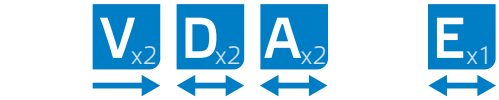


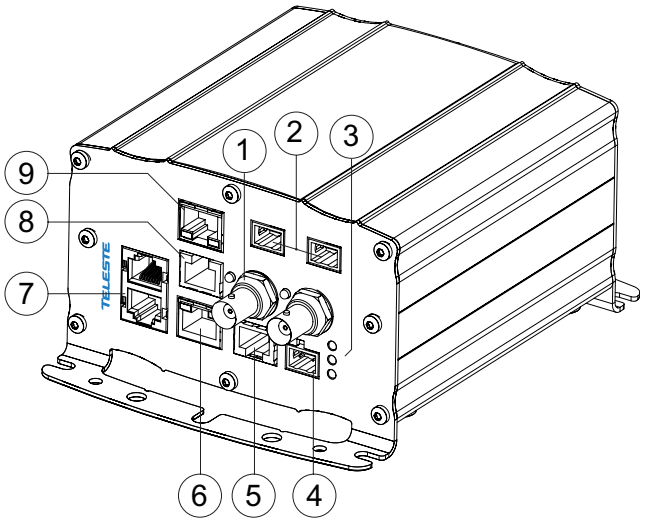


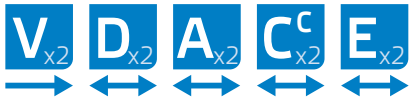


MPC-D2 combinations

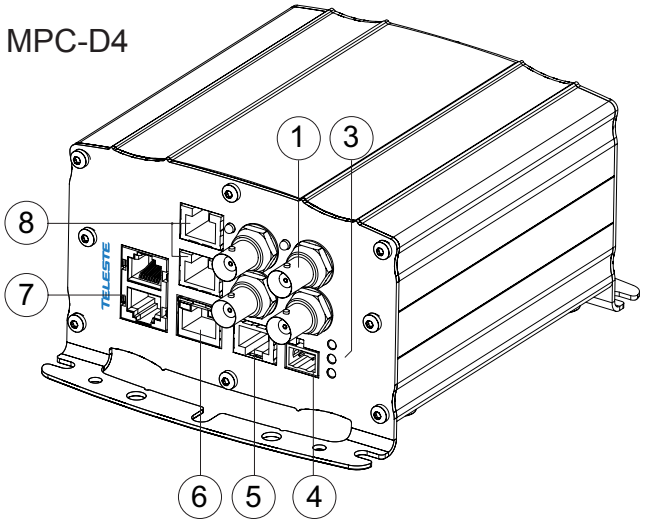


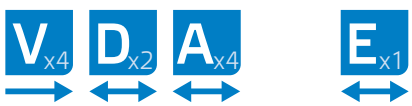






MPC-D4





MPC series video decoders mechanical connections

1. **Video** output(s) connector (BNC female) and indicator leds.
2. **Contact closure** interfaces (4-pin screw terminal).*
3. **Led indicators**. See tables below for detailed description.
4. **Power supply** connector (2-pin screw terminal, +12 VDC).
5. **Management** connection (CLI) (RJ-45 female).
6. **Fast Ethernet** up-link interface (port A).
   Either **electrical** (RJ-45 female) or **optical** (LC).
7. **Data** interfaces EIA RS232/422/485 (RJ-45 female).
8. **Audio** line connection (RJ-45 female).
9. **Fast Ethernet** interface (port B), fixed (RJ-45 female).*

   * optional

   See further information on dedicated sections.

Led	Colour	Mode
T	Green	Port configured
	Blinking green	On stream
	Yellow	Link missing
	Dark	Port not configured

T - (terminal server) Indicator operation.

Led	Colour	Mode
L	Green	Link OK
	Yellow	Link missing or level too low
	Dark	Not in use

L - (Ethernet network link) Indicator operation.

Only A-port up and configured:
- Green when A-port has cable connected
- Yellow when A-port has not cable (B-port doesn't affect)

Only B-port up and configured:
- Green when B-port has cable connected
- Yellow when B-port has not cable (A-port doesn't affect)

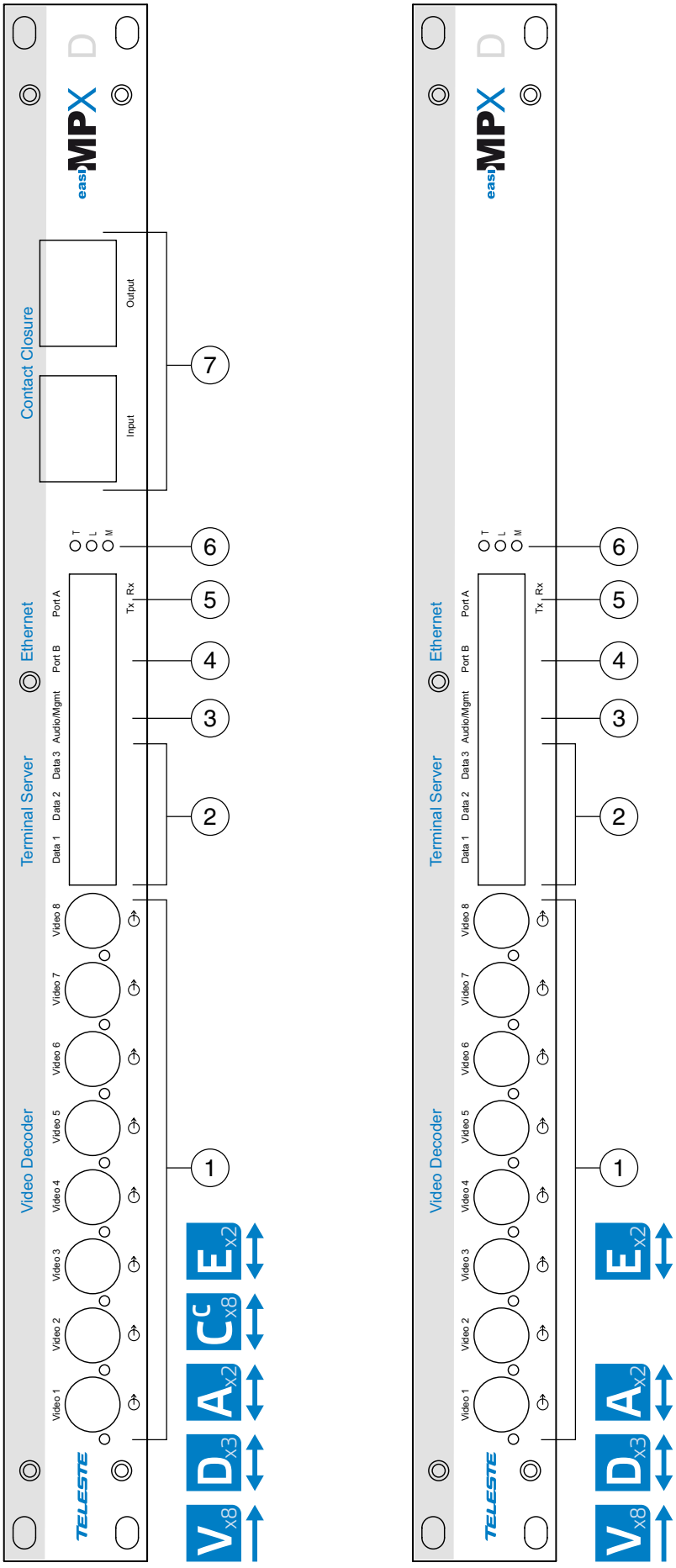
Both A- and B- ports up and configured:
- Green when both A- and B-ports has cable connected
- Yellow when either of the cables is disconnected

Led	Colour	Mode
M	Green	Power ON
	Blinking green	Device is being configured from the web interface
	Red	Hardware error

M - (module) Indicator operation.

MPX Series Video Decoders Front Panel

MPX-D8 combinations



MPX series video decoders mechanical connections

1. **Video** output(s) connector (BNC female) and indicator leds.
2. **Data** interfaces EIA RS232/422/485 (RJ-45 female).
3. **Management** connection (CLI) (RJ-45 female) and **Audio** line connection, two channel (RJ-45 female).
4. **Fast Ethernet** interface (port B), fixed (RJ-45 female).
5. **Fast Ethernet** up-link interface (port A). Either **electrical** (RJ-45 female) or **optical** (LC).*
6. **Led indicators**. See tables below for detailed description.
7. **Contact closure** interfaces (8-pin screw terminal).*

   * optional

   See further information on dedicated sections.

Led	Colour	Mode
T	Green	Port configured
	Blinking green	On stream
	Yellow	Link missing
	Dark	Port not configured

T - (terminal server) Indicator operation.

Led	Colour	Mode
L	Green	Link OK
	Yellow	Link missing or level too low
	Dark	Not in use

L - (Ethernet network link) Indicator operation.

Only A-port up and configured:
- Green when A-port has cable connected
- Yellow when A-port has not cable (B-port doesn't affect)

Only B-port up and configured:
- Green when B-port has cable connected
- Yellow when B-port has not cable (A-port doesn't affect)

Both A- and B- ports up and configured:
- Green when both A- and B-ports has cable connected
- Yellow when either of the cables is disconnected

Led	Colour	Mode
M	Green	Power ON
	Blinking green	Device is being configured from the web interface
	Red	Hardware error

M - (module) Indicator operation.

Installation

Quick instructions

1. Install the temperature hardened stand-alone **MPX** decoder device to the installation cabinet. A +12 V supply voltage is provided by a **CPS24x** power supply.

2. Switch on the system power and wait a until the "**L**" and "**M**"- indicators on the front panel of the device are lit. The "**M**" (=module) should lit green to show that hardware is operating properly.

3. Connect all needed data/audio signals to their respective connectors on the device's front panel.

4. Connect a **CVBS** video signals to the **BNC** female connectors on the device.

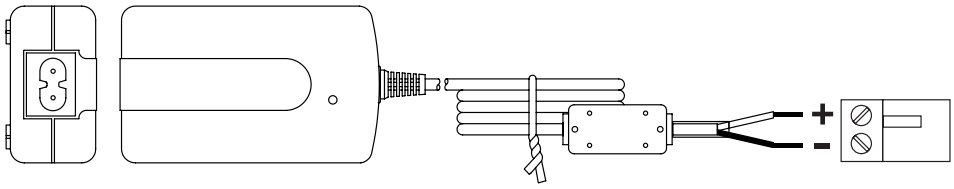
5. Connect the **Ethernet 100Base-TX/FX** network to "**Fast Ethernet**" connector on the device's front panel.

   Note! *A local WebUI connection can be created by this connector using an Ethernet cable such as Teleste* ***OPUS1CAA0300X*** *cross connection cable (when CAT-5 interface).*

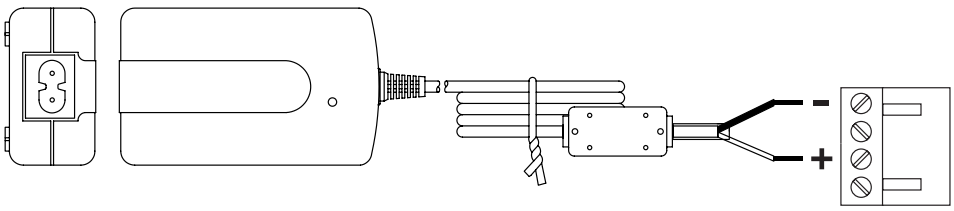
6. Create management connection to the device either over an Ethernet network or from a Mgmt port and then set all necessary settings in the device.
   Factory default settings for the device are the following:
   10.9.96.20 (IP, eth0, Ethernet port A)
   255.255.255.0 (Netmask, eth0, Ethernet port A)
   10.9.96.1 (Gateway)

7. Make sure that the device is not indicating any alarms or warnings. The "**L**" and "**M**" - indicators on the front panel should now lit green.

   Note! *If the "**M**" indicator is red, the device in question has a hardware error and service is needed.*



CPS24x series power supply for MPC device.



CPS24x series power supply for MPX device.

Connections

General

All products in the **MPX** family have the same connection scheme in their connectors. Depending on the model, there are **Video, Data, Audio, Contact closure, Mgmt & Ethernet** connections.

Video connections

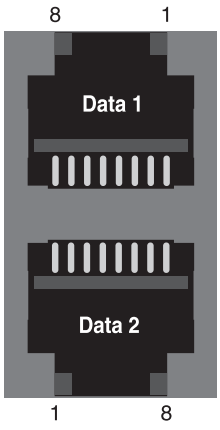
The video connector type is a BNC female. The video output impedance is 75 Ω. The nominal level is 1 Vpp. Video outputs are equipped with dual colour VIDEO indicator led's on the front panel. Video port settings can be configured from web user interface (WebUI).

Led	Colour	Video mode
Video	Green	Port configured and video OK
	Yellow	Port configured and no video
	Dark	Port not configured

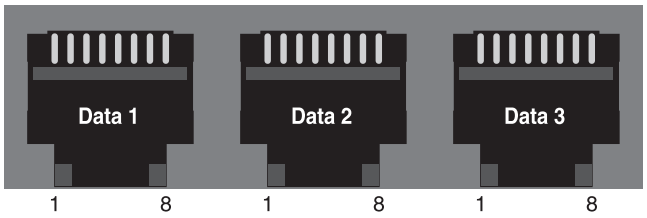
Video indicator led operation.

Data connections

All data connectors provide one bi-directional data channel.
Data port settings can be configured from web user interface (WebUI).
Supported data types are **RS232**, **RS422**, **RS485-2w** and **RS485-4w**.
A recommended cable for data connection is Teleste **CIC603**.



MPC data connectors (2 x RJ-45 female).



MPX data connectors (3 x RJ-45 female).

Pin	Colour
1	White / green stripe
2	Green
3	White / orange stripe
4	Blue
5	White / blue stripe
6	Orange
7	White / brown stripe
8	Brown

CIC603 cable's pinout / wire colors (RJ-45 male / open wires).

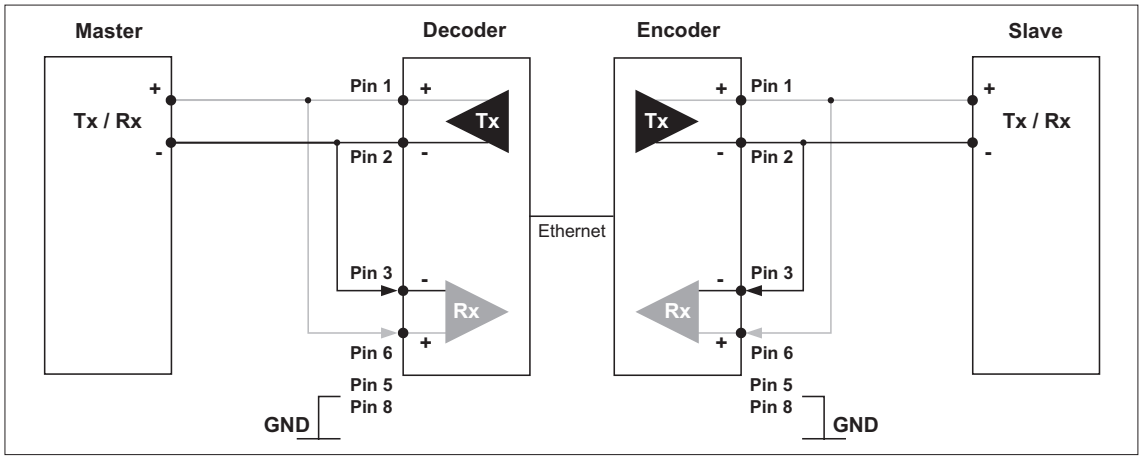
Pin	RS232	RS422	RS485-2w	RS485-4w
1		out +	in / out +	out +
2	out	out -	in / out -	out -
3		in -	in / out -	in -
4				
5	Ground	Ground	Ground	Ground
6	in	in +	in / out +	in +
7				
8	Ground	Ground	Ground	Ground

Data connector's pinout and supported data types.

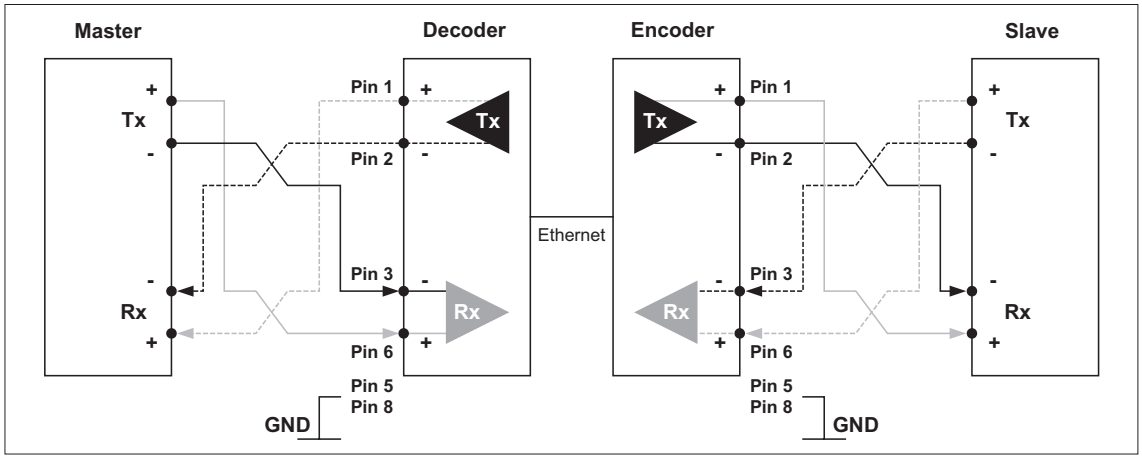
RS232 is an unbalanced data format (i.e. the signal wire working against a reference – ground). Simplex RS232 requires two connections (signal and ground). Full-duplex RS232 requires three connections (signal TX, signal RX and ground).

RS422 is a balanced data format. Simplex RS422 requires three data connections (+/- and ground). Full-duplex RS422 requires five data connections (in+/in-, out+/out- and ground).

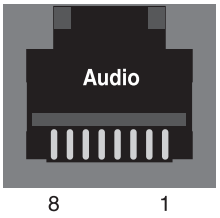
RS485 is used for full-multipoint communications where multiple transceiver devices may be connected to a single twisted-pair signal cable. Most RS485 systems use a Master/Slave architecture, where each Slave unit has a unique address and responds only to packets addressed to that unit. Packets are generated by the Master (e.g. CCTV controller keyboard), which periodically 'polls' all connected Slave units (e.g. CCTV camera receiver units). The Slave unit that has been addressed then sends the appropriate reply packet back to the Master. Slave units have no means of initiating communication without the risk of a collision so they need to be assigned the 'right to transmit' by the Master (by polling). RS485 exists in two versions, 2-wire and 4-wire.



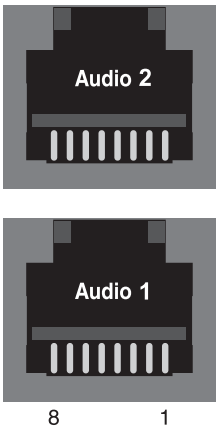
RS485-2w data connection diagram.
A 2-wire RS485 network is implemented as a half-duplex system using single twisted-pair cabling. This means that data can flow in both directions but only in one direction at a time.



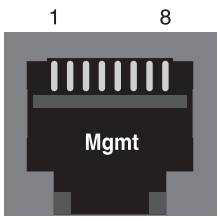
RS422 / RS485-4w data connection diagram.
A 4-wire RS485 network can be implemented as a full-duplex system using two twisted-pair buses where each bus is used for each direction of transmission.



Audio connector, two audio channel MPC/MPX models (1 x RJ-45 female).



Audio connector, four audio channel MPC-D4 models (2 x RJ-45 female).



Mgmt connector (RJ-45 female).

Pin	Signal
1	Ground
2	Mgmt out
3	Ground
4	
5	
6	Mgmt in
7	
8	

Mgmt connector's pinout.
A recommended management cable is Teleste **CIC504**.

Audio connection

The Audio connector(s) provides two bi-directional audio channels, which can be used for one stereo audio or two mono audio purposes. The audio interface supports unbalanced wiring. The audio impedance is constant and cannot be adjusted. The audio input impedance is >10 kΩ and the output impedance is <50 Ω. The audio channels operates independently, i.e. despite the absence of all video signals.

Pin	Unbalanced signal
1	Ground
2	
3	Ground
4	Audio out +
5	Audio out -
6	
7	Audio in +
8	Audio in -

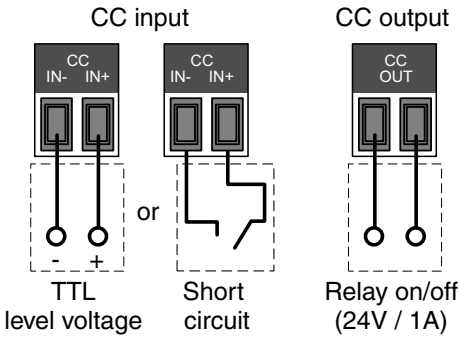
Audio connector's pinout. A recommended audio cable is Teleste **CIC603**.

Mgmt connection

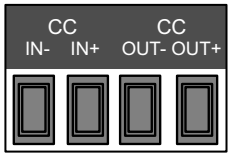
The Mgmt (Management) connector provides one bi-directional (**RS232**) data channel. The Mgmt connection is for local configuration and control of **MPX** series decoders. The command line interface (CLI) is intended for administration use, and can be accessed locally using serial terminal emulator application or remotely through Ethernet port using terminal emulator application supporting Secure Shell (SSH) network protocol. Typical use of the CLI is to set up the IP address for the decoder, update the decoder's software and for remote diagnostics.

PC/PSION	D9 female	RJ-45 male	MPX-Decoder
Receive data	2	2	Mgmt output
Transmit data	3	6	Mgmt input
System ground	5	1	Ground

Management cable (**CIC504**) pinout (D9 female / RJ-45 male).



Contact closure connections.

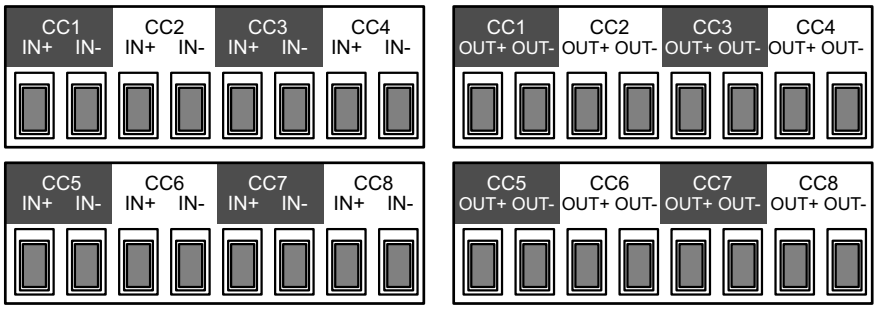


Contact closure connector, one channel, MPC models, (4-pin screw terminal).

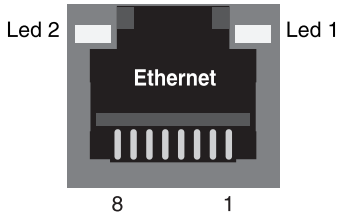
Contact closure loop (CCL) connection (optional)

The **MPC** series video decoders provides optionally 1 or 3 bi-directional contact closure channel lines. The **MPX-D8** series video decoders provides optionally 8 bi-directional contact closure channel lines.

There are optionally two different CC input connection ways, one for a normal short circuit (dry contact closure) on / off - input signals between connector's contact pins (internal power source) and one for TTL level voltage input signals (data rate max 5 Hz, sink current 20 mA at 5V DC) between contact pins (external power source). CC output is a normal relay on/off - output signal (24V / 1A) between connector's contact pins. Depending on the model, the CCL connector type is a 4 or 8 - pin screw terminal.



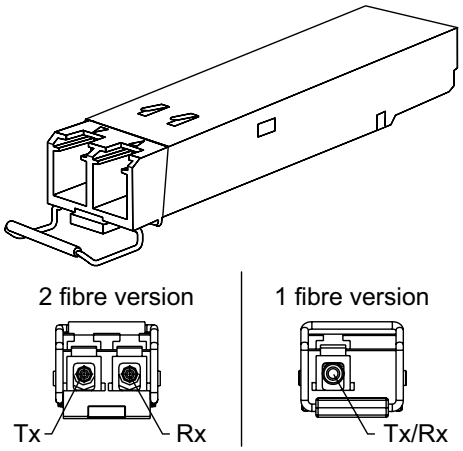
Contact closure connector, eight channel, MPX-D8 (8-pin screw terminal).



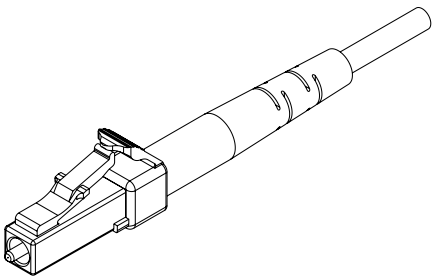
Ethernet connector (CAT5).

Pin	Signal
1	Tx +
2	Tx -
3	Rx +
4	
5	
6	Rx -
7	
8	

Ethernet connector's pinout (CAT5).



SFP plug-in optical transceiver module.



Optical connector type is LC.

Ethernet connections

The Fast Ethernet **Port A** (eth0) interface is **10/100Base-TX** or **100Base-FX** Ethernet network interface. The connector type is either a **RJ-45 female** (when electrical) or **LC** (when optical). The **100Base-FX** Fast Ethernet **Port A** interface is a small form-factor pluggable (**SFP**).

The Fast Ethernet **Port B** (eth1) interface is a fixed **10/100Base-TX** Ethernet interface. The connector type is a **RJ-45 female**.

Led	Colour	Ethernet mode
2	Orange	Link up
	Blinking orange	On stream
	Dark	Receiving data
1	Yellow	100 Mbps
	Dark	10 Mbps

Ethernet port's (A & B) led indicator operation.

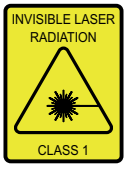
Fibre connection

The optical Ethernet up-link interface is a small form-factor pluggable (**SFP**). The small form-factor pluggable is a specification for a new generation of optical modular transceivers. The optical output level is constant and cannot be adjusted.

When installing the fibre optic cable, do not exceed the minimum bending radius when connecting cable to the system.

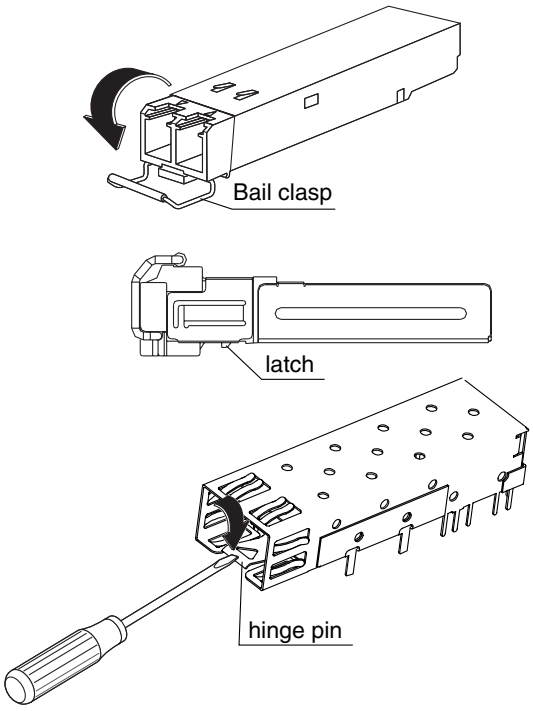
> ***Note!*** *For correct optical operation ensure that all optical connectors are cleaned immediately before mating. Connectors should always be cleaned using high purity alcohol (e.g. methyl or isopropyl alcohol). Dry the surfaces using clean compressed air or other equivalent pressurised gas. The optical connectors on the equipment should always be protected with dustcaps when there is no fibre inserted.*

Optical Ethernet connection meets **class 1 laser** safety requirements of IEC 60825-2: 2004 and US department of health services 21 CFR 1040.10 and 1040.11 (1990) when operated within the specified temperature, power supply and duty cycle ranges.



How to unplug or plug-in the SFP transceiver module

If your up-link port requirements change, simply unplug the existing SFP module, and plug-in the new module. The SFP transceiver modules must be installed before the decoder is powered on.
The SFP transceiver module has a bale-clasp latch that makes easier to install or remove the module. Protect the SFP module by inserting a clean dustplug into the module after you remove the fiber cable.
Be sure to clean the optic surfaces of the fiber cable before you plug the cable into another module. When using 2 fibre version SFP, check which connector plug is send (Tx) and which is receive (Rx) .



SFP module's locking release points.

To unplug and plug-in the SFP module, follow these steps

1. Open the bale clasp on the SFP module by pressing the clasp downward until it is in a horizontal position.

2. Use a small flat-blade screwdriver or other long, narrow instrument to push on the hinge pin to unlock the SFP cage latch.

3. Grasp the SFP module by the bale clasp and gently pull it out of the SFP cage.

To plug-in the module:

4. Orient the transceiver with the bale clasp on the bottom, close the bale clasp by pushing it up over the transceiver, then gently insert the transceiver into the port until it clicks into place.

How to change the settings

General

This chapter tells how you can configure and check the settings of **MPX** series video decoders with the help of web user interface (WebUI) or command line interface (CLI).

Web user interface (WebUI)

Teleste's WebUI provides an user friendly way to configure and manage **MPX** series video decoders. WebUI can be accessed using Internet browser such as Internet Explorer.

Command line interface (CLI)

Teleste's **MPX** series video decoders include also a text-based user interface (CLI) for configuration purposes. CLI is accessed through any terminal emulator application, locally using serial connection (e.g. Hyper Terminal) or remotely using TCP/IP (e.g. PuTTY). See pages 40-42 for detailed description.

User groups

There are different user levels, which are determined by the username and password. The username and password can be change via the WebUI and CLI.

User group	Username	Password	Authority
Administrator	admin	easix	Read and write access to all pages and all settings
Operators	-	-	Read-only access

User groups for WebUI and CLI.

Note! *See section user management, page 38.*

Web user interface (WebUI)

General

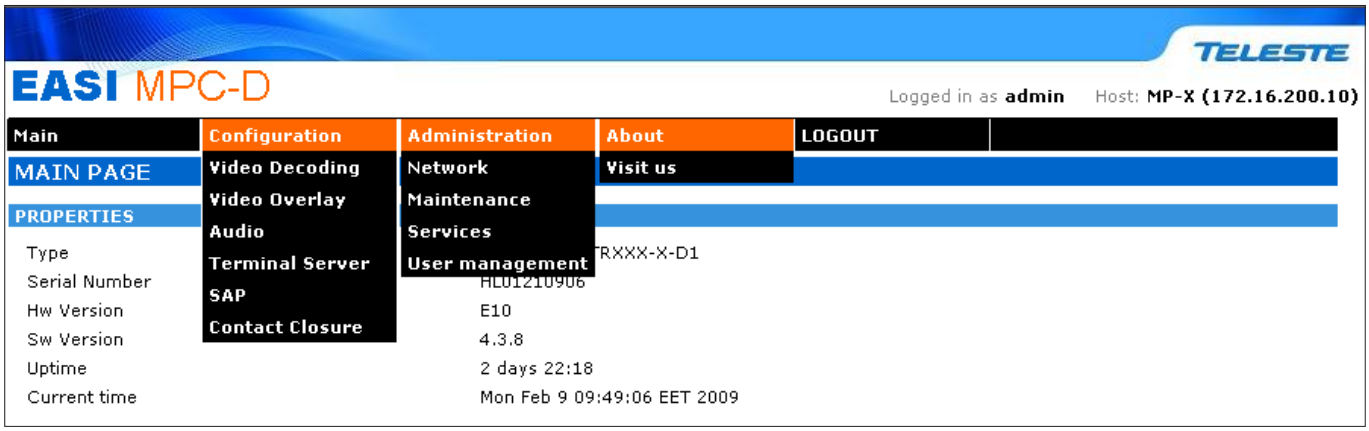
The **MPX** series video decoders can be fully controlled using Web user interface (WebUI). You can access the Web user interface either locally using Ethenet crossover cable such as Teleste **OPUS1CAA0300X** (when CAT-5 interface) or remotely over the Ethernet connection.

System requirements for WebUI

* PC equipped with an Ethernet Network card and an Internet browser installed.
* Cross-connected Ethernet cable (e.g. type **OPUS1CAA0300X**).

Operation

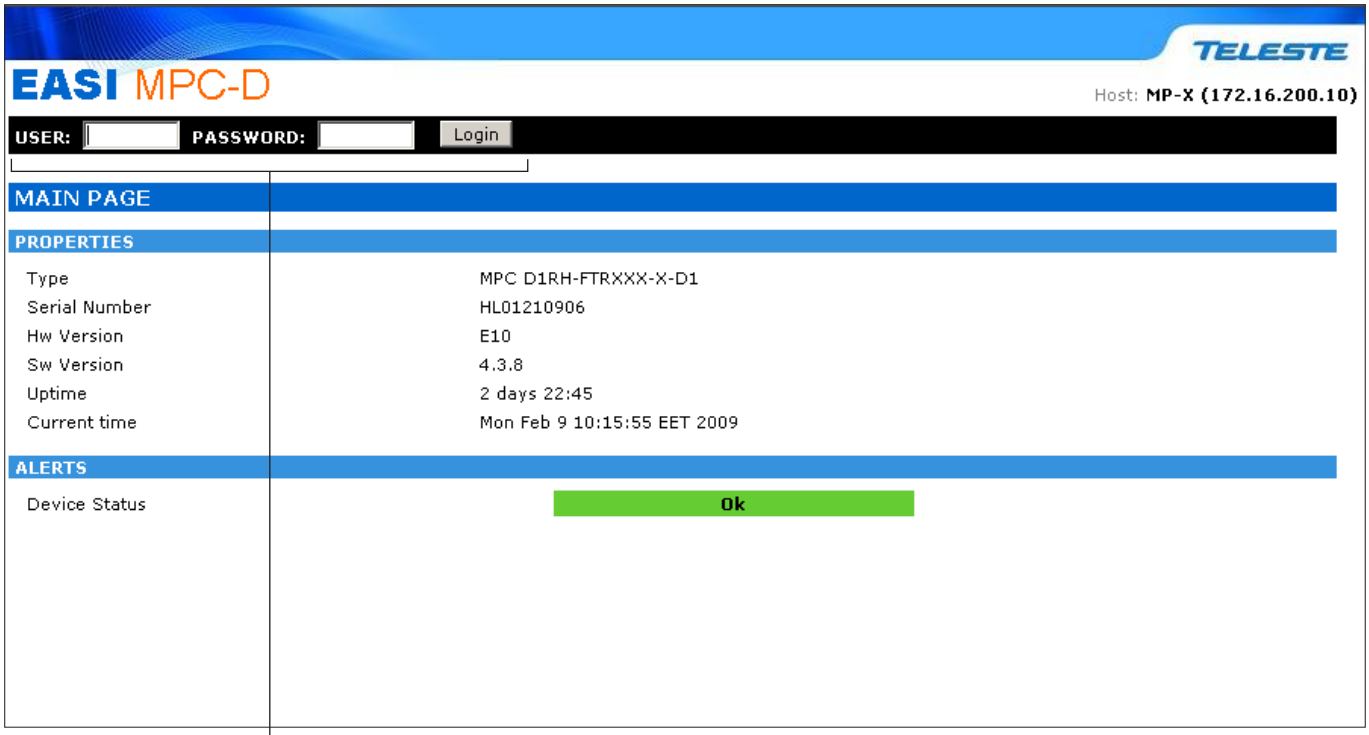
Web user interface window consists of several pages. Only one page is visible at the time. You can activate a page simply by clicking the page's heading (see picture below).
The Web user interface has the following configuration display pages that are introduced in this document:



The information on configuration pages is shown in data fields or boxes. The settings can be changed in the data fields and boxes having white background. Place the cursor in the desired data field or box and enter a new setting. Some settings are entered by ticking a checkbox or clicking on a radio button, by selecting from a pull-down list or by scrolling digits with the help of spin buttons.
Information without datafield or box is a read only parameter and cannot be changed.

Press keyboard's F5 button to refresh the WebUI page view.

When changing the settings, always click OK button to confirm settings.

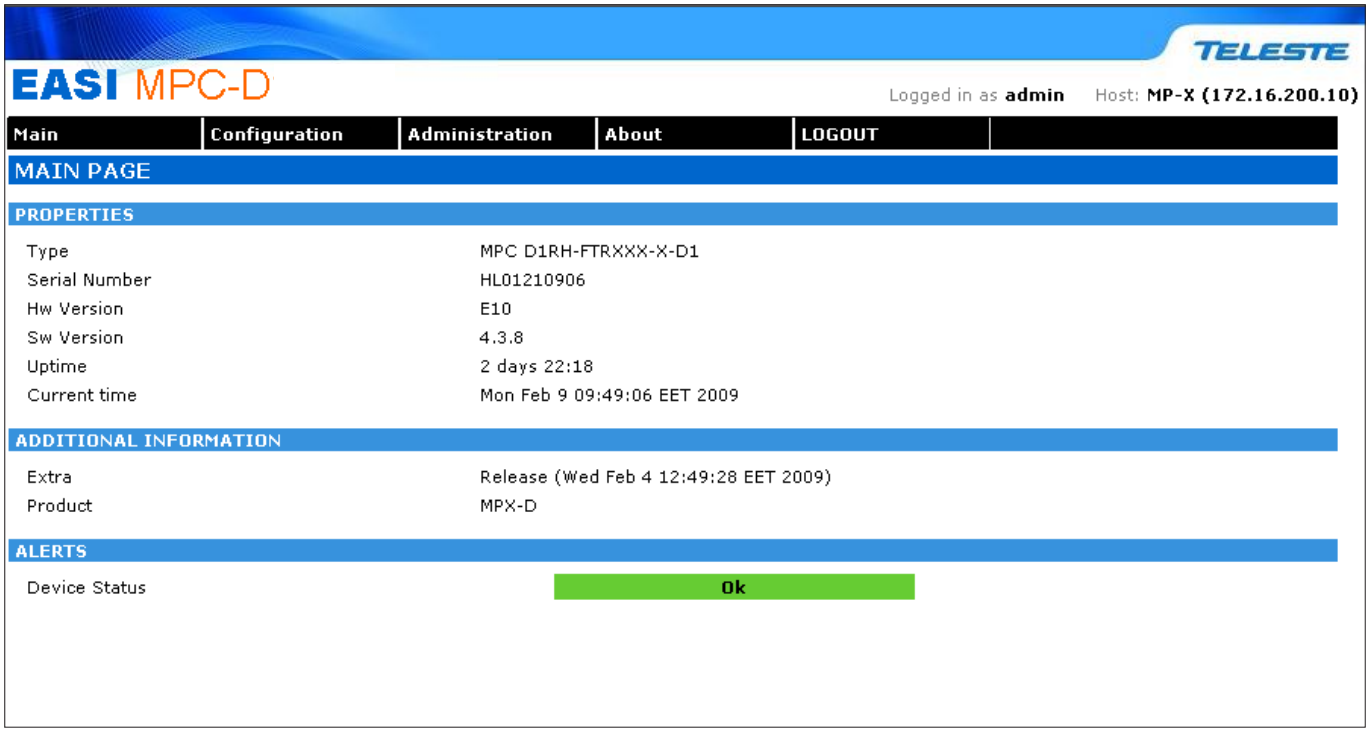


Starting

To create a WebUI session to the device, first enter the device IP address into the web browser's address bar. **MPX** series video decoders default factory IP address is **10.9.96.20**.
The following Web user interface's MAIN PAGE will appear on the screen. Write the required username and password (see below) in the fields and then click Login button to continue --> Web user interface's MAIN PAGE appears on the screen (see picture above).
Front panel **M**-led blinks for successful login.

The Web user interface session to **MPX** series video decoders is now active.

> ***Note!*** *User can logout either by selecting Logout from menu bar or by closing the browser. WebUI session can also automatically expire and logout within 60 minutes if no activity.*



MAIN PAGE

The MAIN PAGE is opened after the WebUI session has been established to the **MPX** series video decoder. This page shows device's current properties and alerts.

Logged in as: User's authority class.
Host: Alias name for the device (uniquely identifies each device in the network) and it's IP address.

PROPERTIES

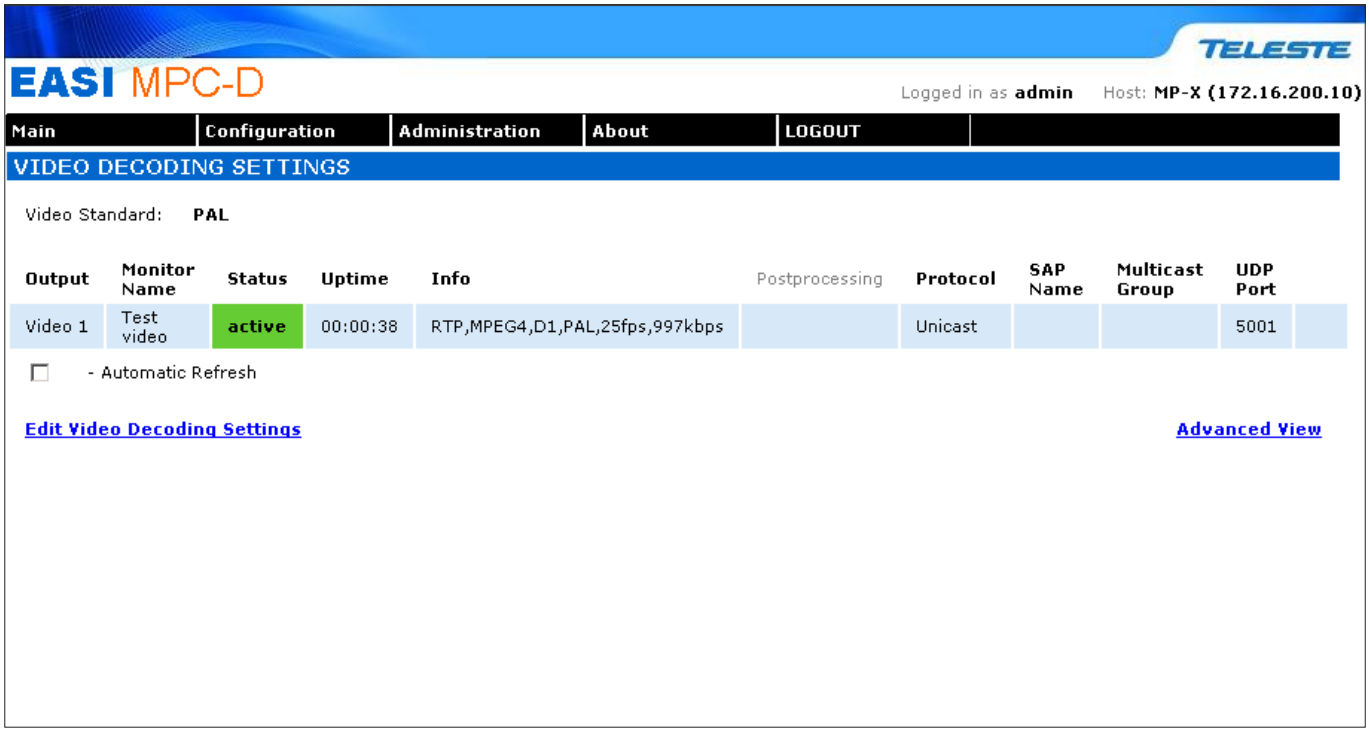
Type: Device type (part number).
Serial Number: Device serial number.
HW Version: Device hardware version.
SW Version: Device firmware version.
Uptime: Device uptime (display the time since the last power-up).
Current time: Device current time.

ADDITIONAL INFORMATION

Extra: Current firmware release timestamp.
Product: Product software release type.

ALERTS

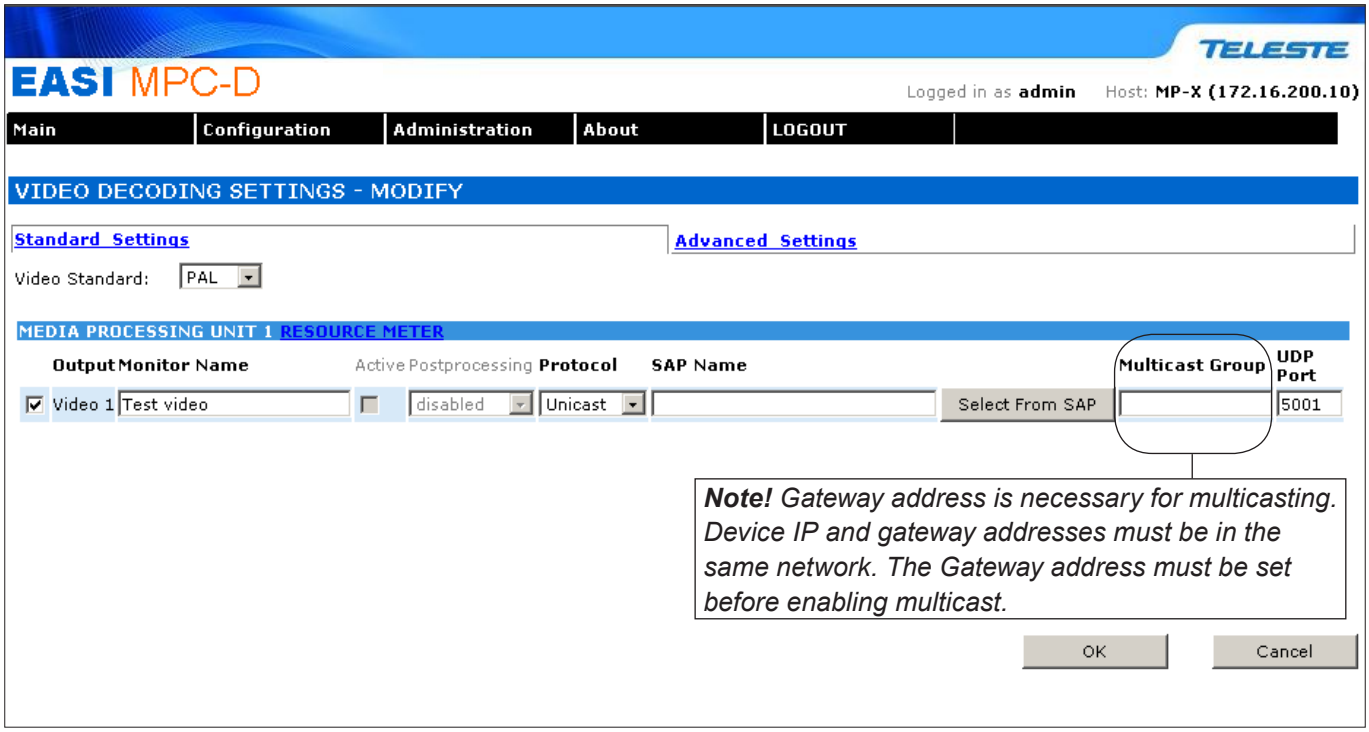
Device Status: Shows device's current status. The colour bar change color to reflect the status of the device. Green colour bar with Ok text indicates that there is no alert(s). Yellow colour bar with text indicates that there is alert(s).



VIDEO DECODING SETTINGS

Click "**Video Decoding**" menu under the Configuration heading. Video decoding settings page appears on the screen. This page shows device's video decoding settings.

Video standard: Video standard type (PAL or NTSC).
Output: Active video output(s).
Monitor name: User definable alias name for the video output.
Status: Shows video status. The colour bar change color to reflect the status of the video. Green colour bar indicates that there is no alert(s). Yellow colour bar with text indicates that there is alert(s).
Uptime: Video channel's operating time.
Info: Video channel's settings.
Postprocessing: Not in use in the current SW version.
Protocol: Video transmission protocol, either Unicast or Multicast.
SAP name: User definable alias name for the session announcement protocol.
Multicast Group: Multicast group IP address. This address has to be same at both encoder and decoder channel pairs.
UDP port: UDP port number. This number has to be same at both encoder and decoder channel pairs.



VIDEO DECODING SETTINGS - MODIFY

Click "**Edit video decoding settings**" menu under the VIDEO DECODING SETTINGS heading. Video decoding settings - modify / standard settings appears on the screen. Device video settings can be changed on this page.

Video standard: Set video standard type, either PAL or NTSC.

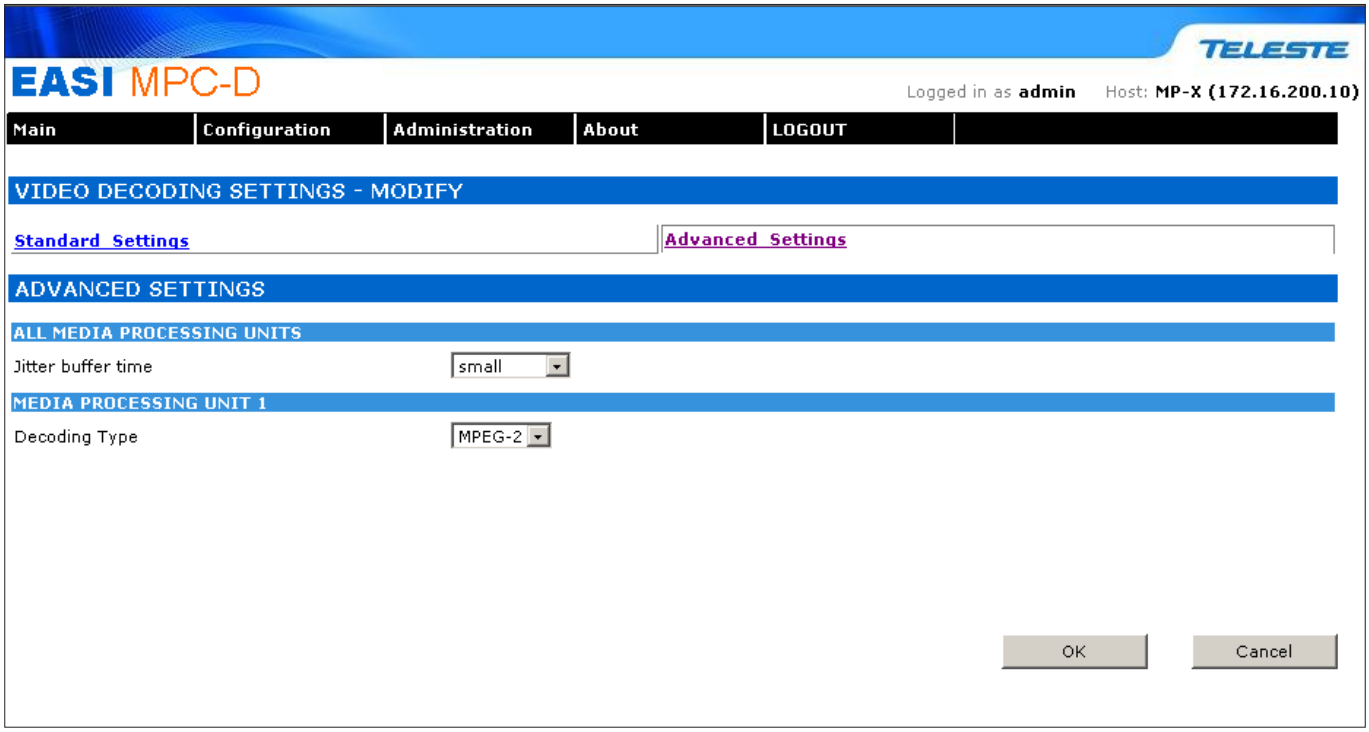
MEDIA PROCESSING UNIT

Output: Enable/disable video output.
Monitor Name: User definable alias name for the video output (max 16 chars).
Active: Active/inactive video output.
Postprocessing: Not in use in the current SW version.
Protocol: Video transmission protocol, either Unicast or Multicast.
SAP name: User definable alias name for the session announcement protocol.
Multicast Group: Multicast group IP address.
UDP port: UDP port number. This number has to be same at both encoder and decoder channel pairs.

***Note!** Although both even and odd UDP port numbers are supported, it is recommended to use even port numbers to ensure compatibility with some of the standard software encoders.*

Available video resolutions.

Resolution	PAL	NTSC	Framerate	Interlaced	Note
D1	720 x 576	720 x 480	25 PAL, 30 NTSC	Yes	
HALF D1	352 x 576	352 x 480	25 PAL, 30 NTSC	Yes	MPEG-4 only
4CIF	704 x 576	704 x 480	1...25 PAL, 1...30 NTSC	No	
4CIFpi	704 x 576	704 x 480	1...25 PAL, 1...30 NTSC	Yes	MJPEG only
2CIF	704 x 288	704 x 240	1...25 PAL, 1...30 NTSC	No	
CIF	352 x 288	352 x 240	1...25 PAL, 1...30 NTSC	No	
QCIF	176 x 144	176 x 112	1...25 PAL, 1...30 NTSC	No	



VIDEO DECODING SETTINGS - MODIFY

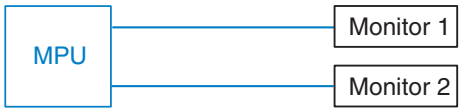
Click "**Advanced Settings**" menu under the VIDEO DECODING SETTINGS- MODIFY heading. Video decoding settings - modify / Advanced settings appears on the screen. Device video advanced settings can be changed on this page.

ADVANCED SETTINGS

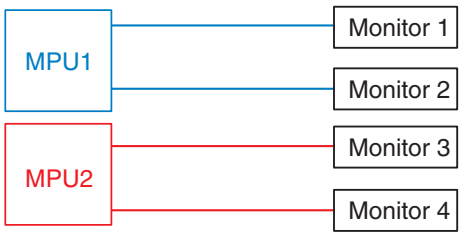
Jitter buffer time: Jitter buffer time selection (Disabled, small, regular, maximum).
Decoding Type: Media processing unit decoding type selection (MPEG-2, MPEG-4).

Note! *A single Media Processing Unit (MPU) cannot decode both MPEG-2 and MPEG-4 video simultaneously.*
Block diagrams describe the way how MPX series decoder physical video output(s) are internally connected to MPU(s)

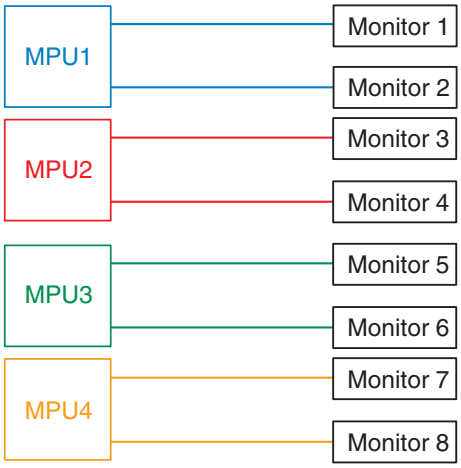
MPC-D1 contains one video output and one media processing unit (MPU).



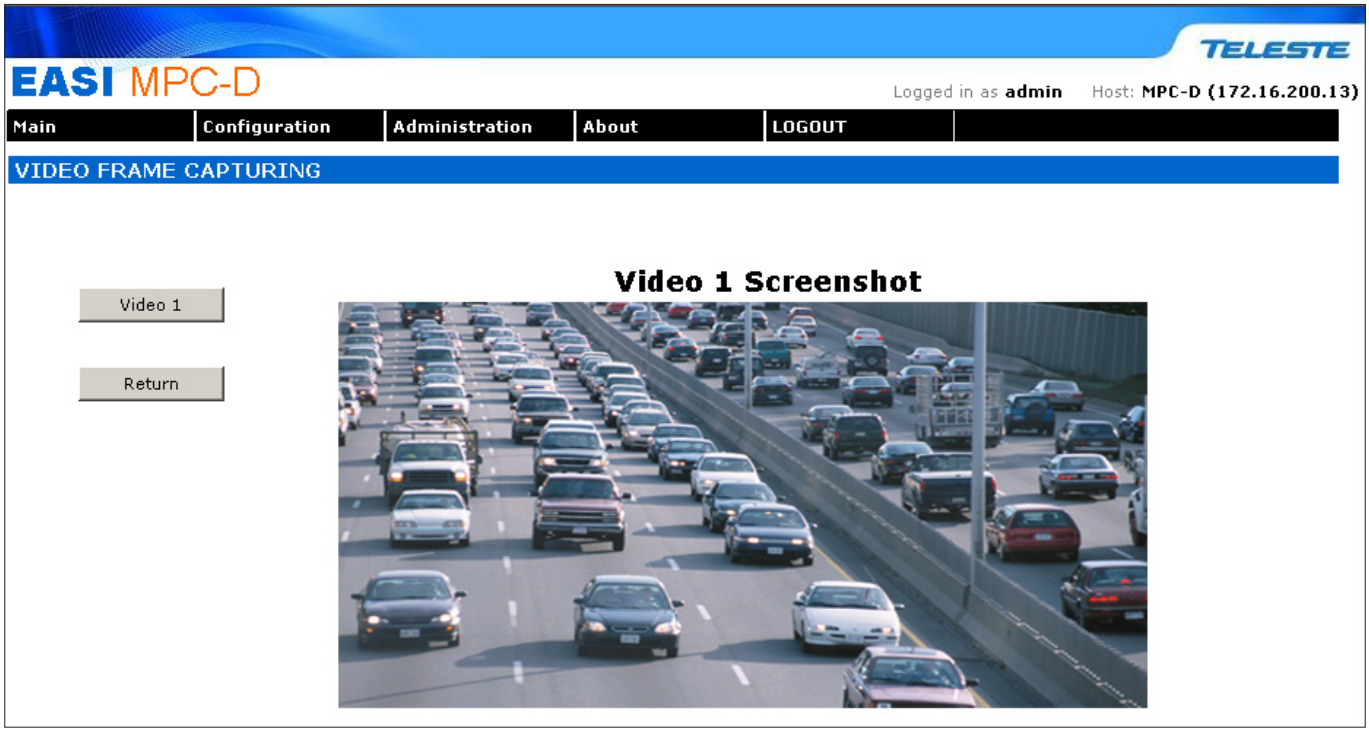
MPC-D2 contains two video outputs and one media processing unit (MPU).



MPC-D4 contains four video outputs and two media processing units (MPUs).

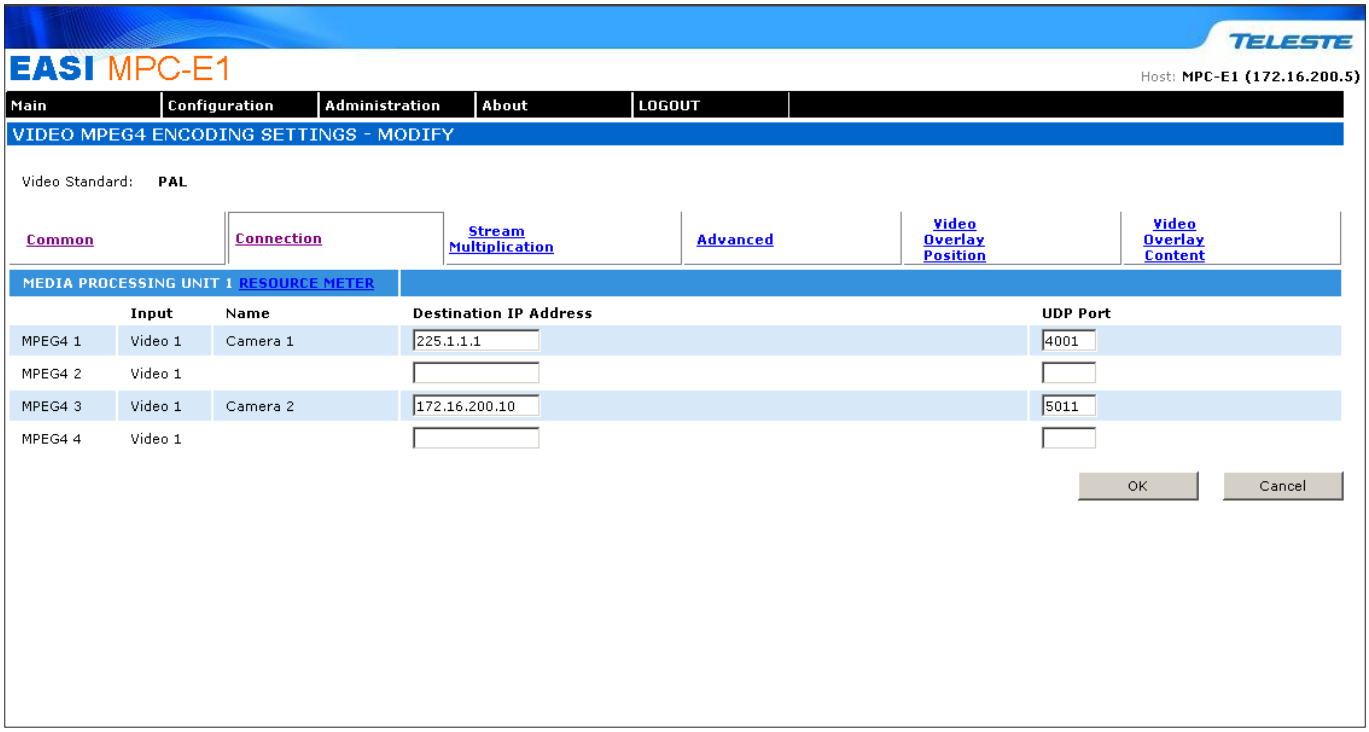


MPX-D8 contains eight video outputs and four media processing units (MPUs).



VIDEO FRAME CAPTURING

Click “**Advanced View**” menu under the VIDEO DECODING SETTINGS heading. Frame capturing page appears on the screen. On this page you can take a screenshots of the active streaming video.

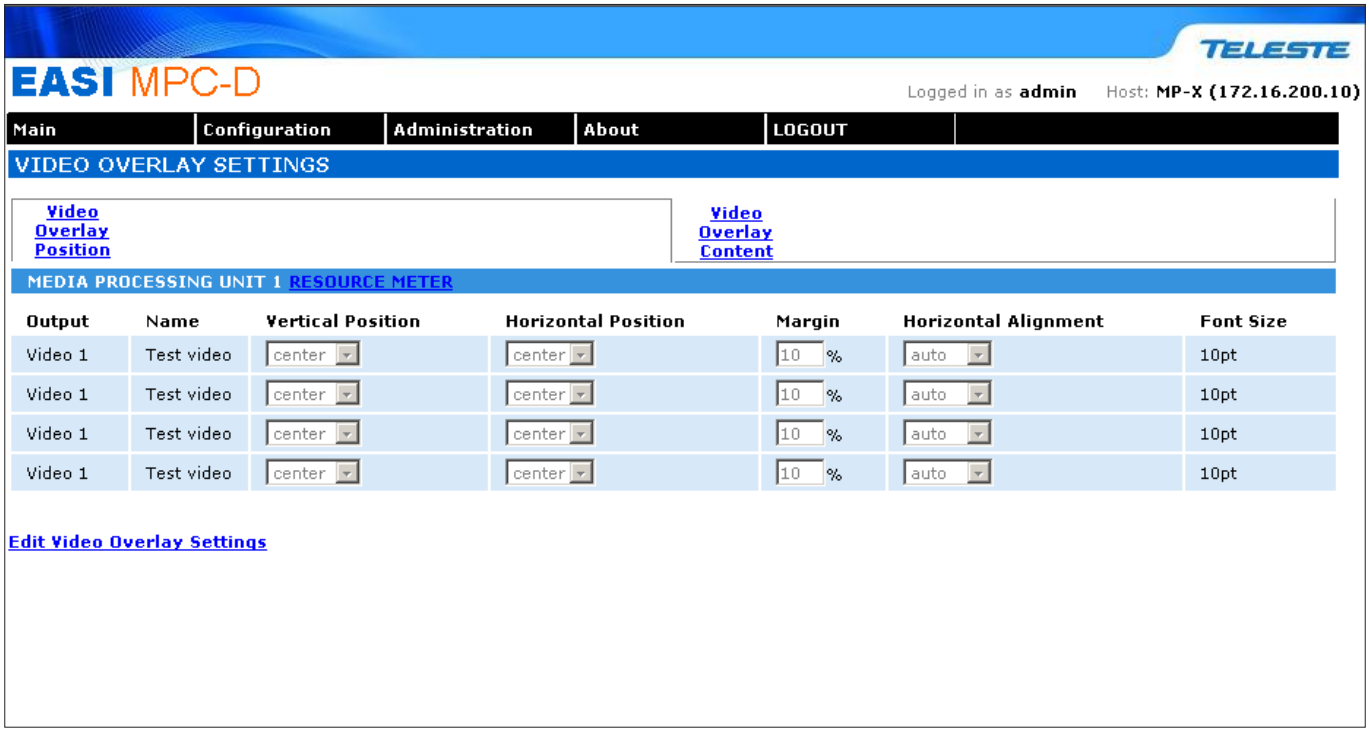


Video encoding settings - modify screen (**MPC-E1**).

Functional configuration examples of Encoder - Decoder video link pair:

Video Standard: PAL		**Video Standard: PAL**
Encoder MEDIA PROCESSING UNIT 1:		**Decoder MEDIA PROCESSING UNIT 1:**
Output: Tick check box		**Output: Tick check box**
Input: Video 1		Output: Monitor 1
Name: Camera 1	**MULTICAST**	Monitor name: Monitor 1
Active: Tick check box	**EXAMPLE**	Active:
Resolution: 2CIF		Postprocessing:
Bitrate mode: CBR		**Protocol: Multicast**
Framerate: 25		SAP name:
Destination IP address: 225.1.1.1		**Multicast Group: 225.1.1.1**
UDP Port: 4001		**UDP Port: 4001**

Video Standard: PAL		**Video Standard: PAL**
Encoder MEDIA PROCESSING UNIT 1:		**Decoder MEDIA PROCESSING UNIT 1:**
Output: Tick check box		**Output: Tick check box**
Input: Video 2	**UNICAST**	Output: Monitor 2
Name: Camera 2	**EXAMPLE**	Monitor name: Monitor 2
Active: Tick check box		Active:
Resolution: 2CIF		Postprocessing:
Bitrate mode: CBR		**Protocol: Unicast**
Framerate: 25		SAP name:
Destination IP address: 172.16.200.10 (decoder IP address)		Multicast Group:
UDP Port: 5011		**UDP Port: 5011**



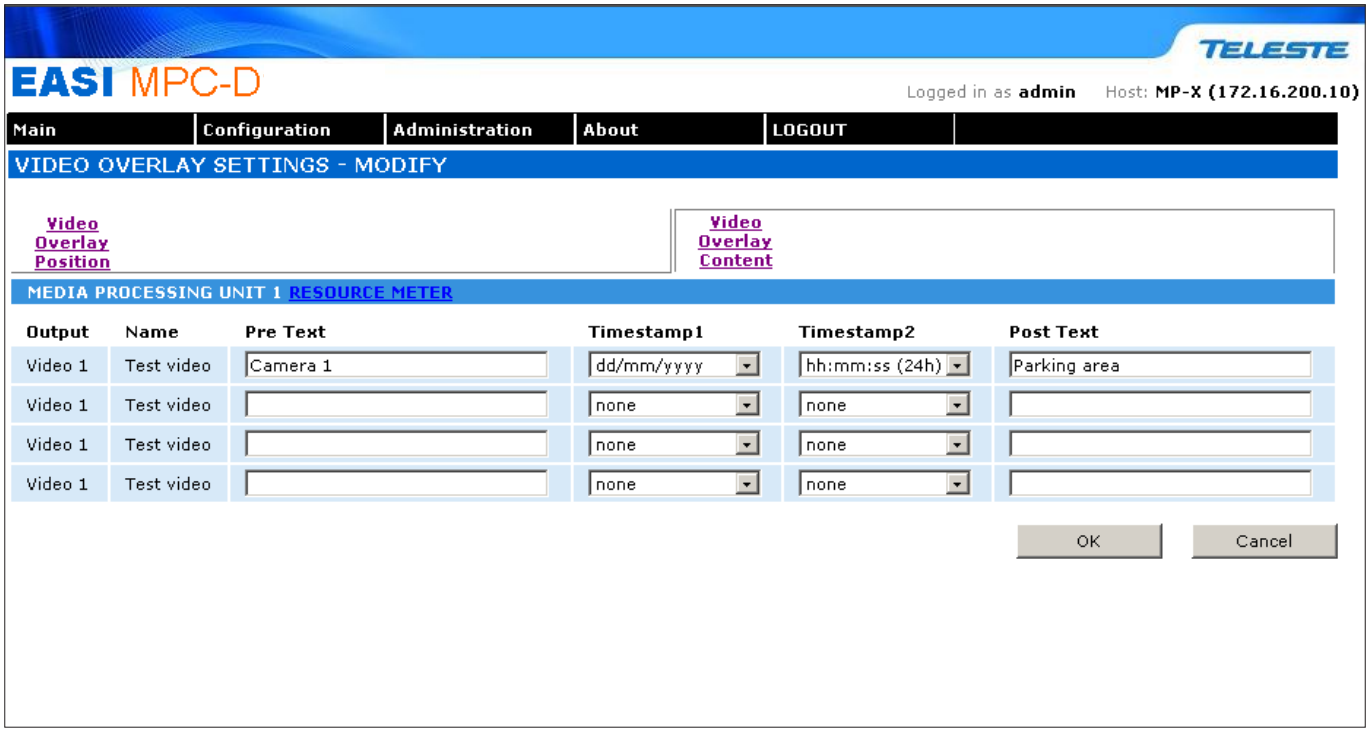
VIDEO OVERLAY SETTINGS

Video overlay is a technique used to display a text over on a video. Click "**Video Overlay**" menu under the Configuration heading. Video overlay settings - Video Overlay Position page appears on the screen. This page shows device's video overlay position settings.

Output: Active video outputs.
Name: User definable alias name for the video output.
Vertical position: Text vertical position on the screen.
Horizontal position: Text horizontal position on the screen.
Margin: Text top margin.
Horizontal alignment: Text horizontal alignment.
Font size: Text font size.

Click "**Video Overlay Content**" menu under the VIDEO OVERLAY SETTINGS heading. Video overlay settings - Video Overlay Content page appears on the screen. This page shows device's video overlay content settings.

Output: Active video outputs.
Name: User definable alias name for the video output.
Pre text: User definable text before time/data stamp.
Timestamp 1: Time/data stamp(s).
Timestamp 2: Time/data stamp(s).
Post text: User definable text after time/data stamp.



VIDEO OVERLAY SETTINGS - MODIFY

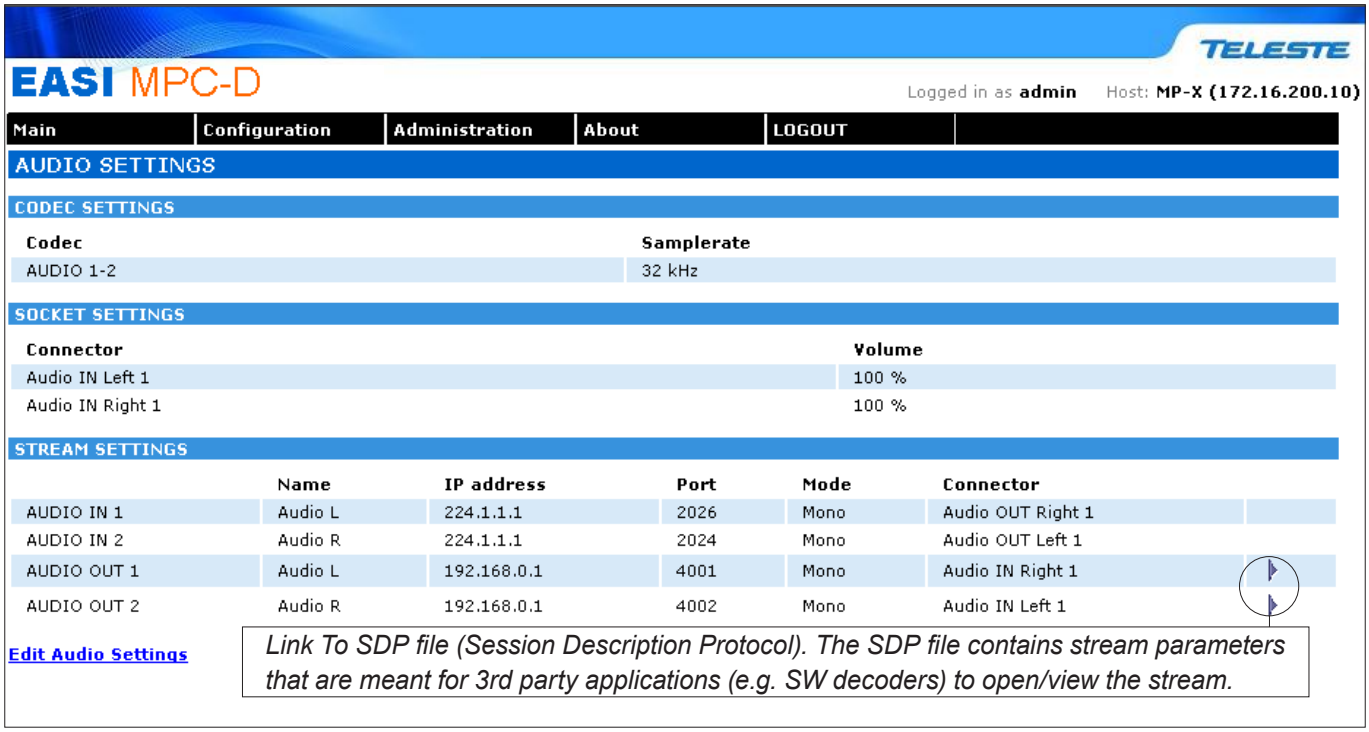
Click "**Edit video overlay settings**" menu under the VIDEO OVERLAY SETTINGS heading. Video overlay settings modify - Video Overlay Position page appears on the screen. Device video overlay position settings can be changed on this page.

MEDIA PROCESSING UNIT

Output: Active video outputs.
Name: User definable alias name for the video output.
Vertical position: Text vertical position, either top, center or bottom of screen.
Horizontal position: Text horizontal position, either left, center or right of screen.
Margin: Text top margin (0...100%).
Horizontal alignment: Text horizontal alignment, either auto, left, center or right.
Font size: Text font size (1...30).

Click "**Video Overlay Content**" menu under the VIDEO OVERLAY SETTINGS - MODIFY heading. Video overlay settings modify - Video Overlay Content page appears on the screen. Device video overlay content settings can be changed on this page.

Output: Active video outputs.
Name: User definable alias name for the video output.
Pre text: Enter text before time/data stamp (max 32 chars).
Timestamp 1: Time/data stamp(s).
Timestamp 2: Time/data stamp(s).
Post text: Enter text after time/data stamp (max 32 chars).



AUDIO SETTINGS

Click "**Audio**" menu under the Configuration heading. Audio settings page appears on the screen. This page shows device's audio settings.

CODEC SETTINGS

Codec Audio codec name.
Samplerate Audio codecs samplerate.

SOCKET SETTINGS

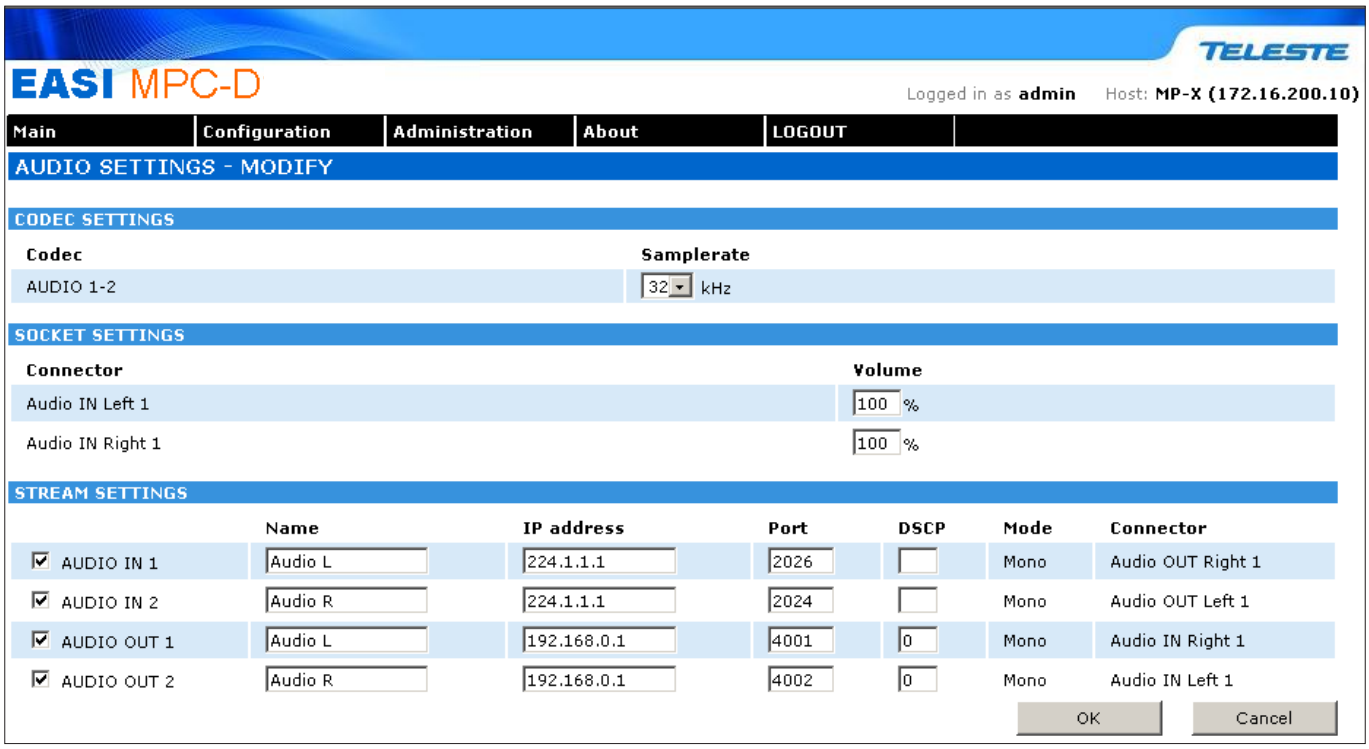
Connector/Volume: Audio IN Left: Audio volume value (0...100%).
Audio IN Right: Audio volume value (0...100%).

STREAM SETTINGS

Name: User definable alias name for the audio stream.
IP address: Destination IP address:
- Multicast: Multicast IP address / multicast group.
- Unicast: IP address of receiving encoder.

Note! *Gateway address is necessary for multicasting.*
Device IP and gateway addresses must be in the same network.
The Gateway address must be set before enabling multicast.

Port: UDP port number.
Mode: Audio channel mode.
Connector: Audio connector (Audio in/out).



AUDIO SETTINGS - MODIFY

Click "**Edit Audio Settings**" menu under the AUDIO SETTINGS heading. Audio settings modify page appears on the screen. Device audio settings can be changed on this page.

CODEC SETTINGS

Codec Audio codec.

Samplerate Select one of the available samplerate values (8KHz or 32 KHz). (Setting a higher samplerate value improves audio file quality and increases its size).

SOCKET SETTINGS

Connector: **Audio IN Left / Volume**: Set a value for audio left volume (0...100%).
Audio IN Right / Volume: Set a value for audio right volume (0...100%).

STREAM SETTINGS

AUDIO IN/OUT tickbox: Enable/disable audio channel.

Name: User definable name/description for the audio stream (max 16 chars).

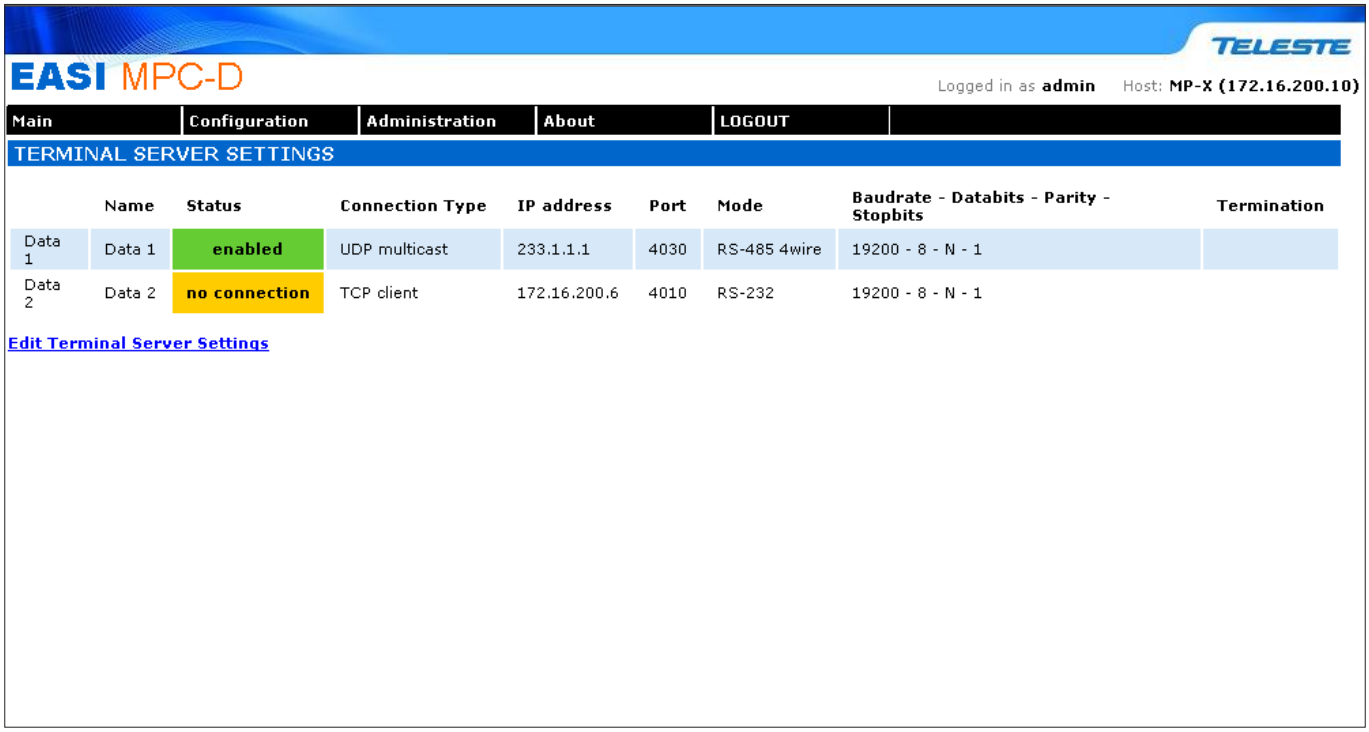
IP address: Destination IP address.
Multicast: Multicast IP address / multicast group. This multicast IP address has to be same at both encoder and corresponging decoders.
Unicast: IP address of receiving encoder.

Port: UDP port number (0...65535). This number has to be same at both encoder and decoder pairs.

DSCP (Definition of the Differentiated Services) field lets you set bits in the stream IP header allowing a network device to apply rules such as how the packet is forwarded in the network and QoS (Quality of service) management.

Mode: Audio channel mode.

Connector: Audio connector (Audio in/out).



TERMINAL SERVER SETTINGS

Click "**Terminal Server**" menu under the Configuration heading. Terminal server settings page appears on the screen. This page shows device's terminal server settings.

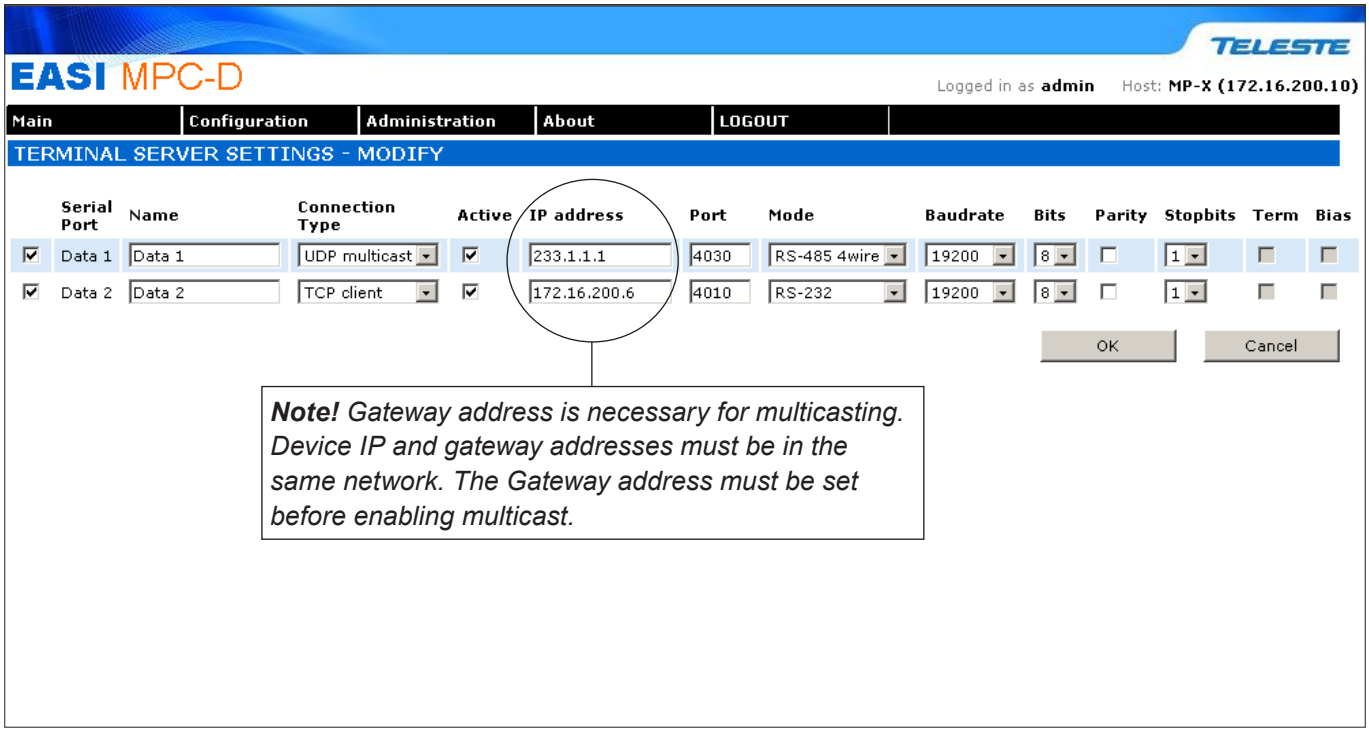
Name: User definable alias name for data interface.
Status: Data status (active/enbled/no connection).
Connection Type: TCP server, TCP client or UDP multicast.
IP address: Destination IP address.
Port: UDP port number.
Mode: Data connection protocol.
Baudrate - Databits - Parity - Stopbits
Baudrate: Data channel connection speed
Bits: Number of data bits
Parity: N = none, P = parity
Stopbits: Stopbits, either 1 or 2
Termination Termination

Example of data channel 1 unicast configuration:

Encoder
Serial port: **Tick check box**
Connection type: **TCP server**
Name: Data 1
Active: **Tick check box**
IP Address: Empty (sets automatically when server selected)
Port: **4010***
Mode: **RS422***
Baudrate: **19200***
Bits: **8***
Parity: **Not ticked***
Stopbits: **1***

Decoder
Serial port: **Tick check box**
Connection type: **TCP client**
Name: Data 1
Active: **Tick check box**
IP Address: **172.6.200.6**
(Encoders IP address)
Port: **4010***
Mode: **RS422***
Baudrate: **19200***
Bits: **8***
Parity: **Not ticked***
Stopbits: **1***

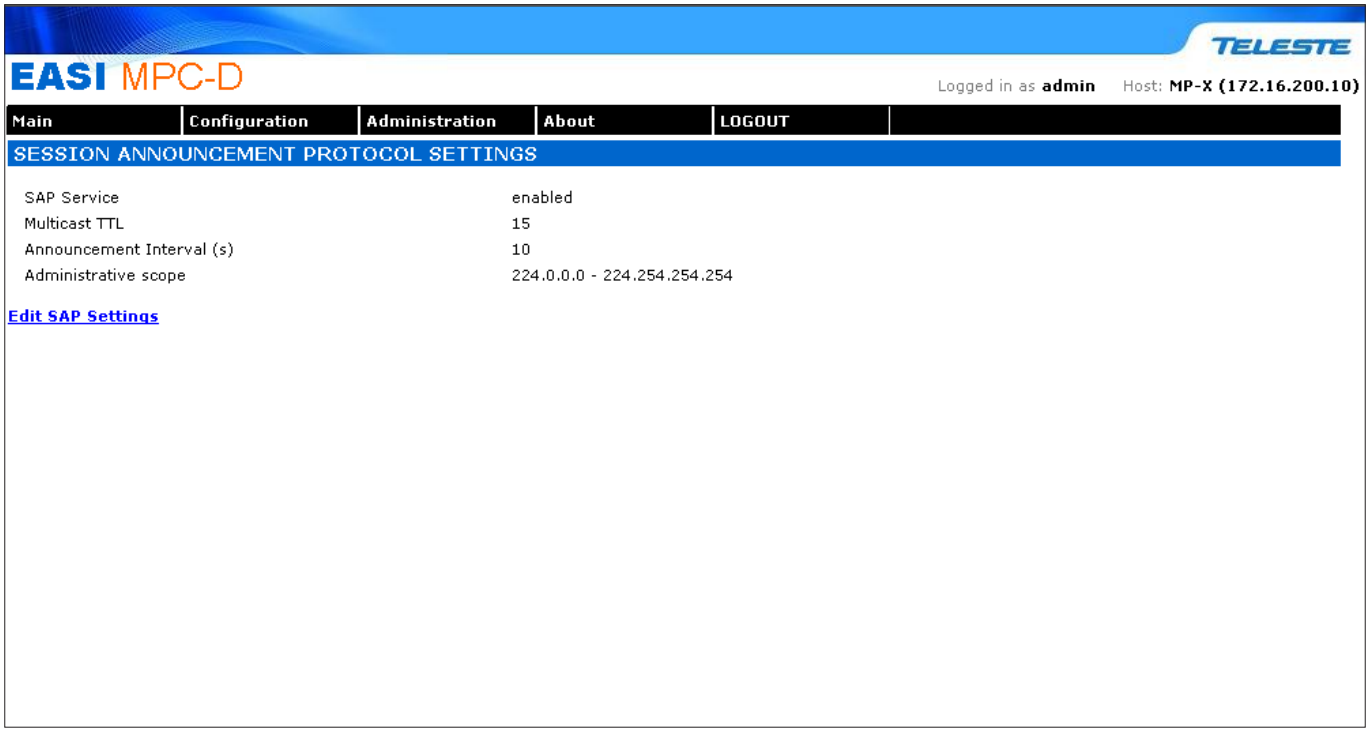
**Has to be set same values at both link pairs*



TERMINAL SERVER SETTINGS - MODIFY

Click "**Edit Terminal Server Settings**" menu under the TERMINAL SERVER SETTINGS heading. Terminal server settings modify page appears on the screen. Device terminal server settings can be changed on this page.

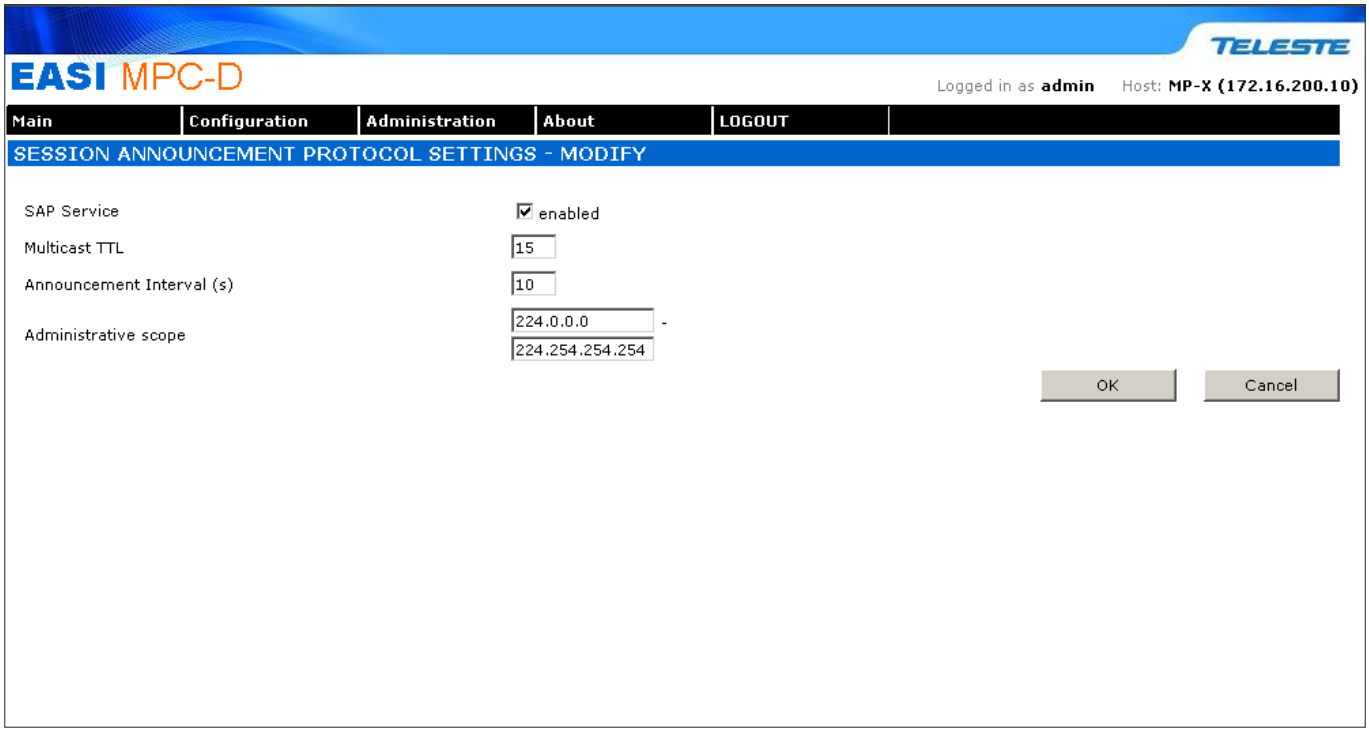
Serial port: Enable/disable required data interface.
Name: User definable alias name for data interface (max 16 chars).
Connection Type: Point-to-point type data transmission is established by selecting the "**TCP server**" and "**TCP client**" settings between the data ports (if the encoder is set to be "TCP server", then the encoder must be set to "TCP client", or vice versa). In UDP multicast mode the service mode is detected automatically.
Active: Set active when required data channel is taken in use.
IP address: Destination IP address (see example on the previous page).
Port: UDP port number (0...65535). This number has to be same at both encoder and decoder pairs.
Mode: Data connection protocol towards the external device, options are RS232/422/485 2-wire/485 4-wire.
Baudrate: Data channel connection speed (range 2400...115200 bps).
Bits: Number of data bits. Options are 5, 6, 7, 8 & 9.
Parity: A data-checking technique, which uses an extra bit.
Stopbits: Options are 1 or 2.
Term: Selected/unselected
Bias: Selected/unselected



SESSION ANNOUNCEMENT PROTOCOL SETTINGS

Click "**SAP**" menu under the Configuration heading. Session announcement protocol settings page appears on the screen. This page shows device's SAP settings.

SAP Service: Service mode, either enabled / disabled.
Multicast TTL: Multicast Time-To-Live for SAP packets.
Announcement Interval (s): SAP timing in seconds.
Administrative scope: Range of IP addresses which create a private notification channel.



SAP SETTINGS - MODIFY

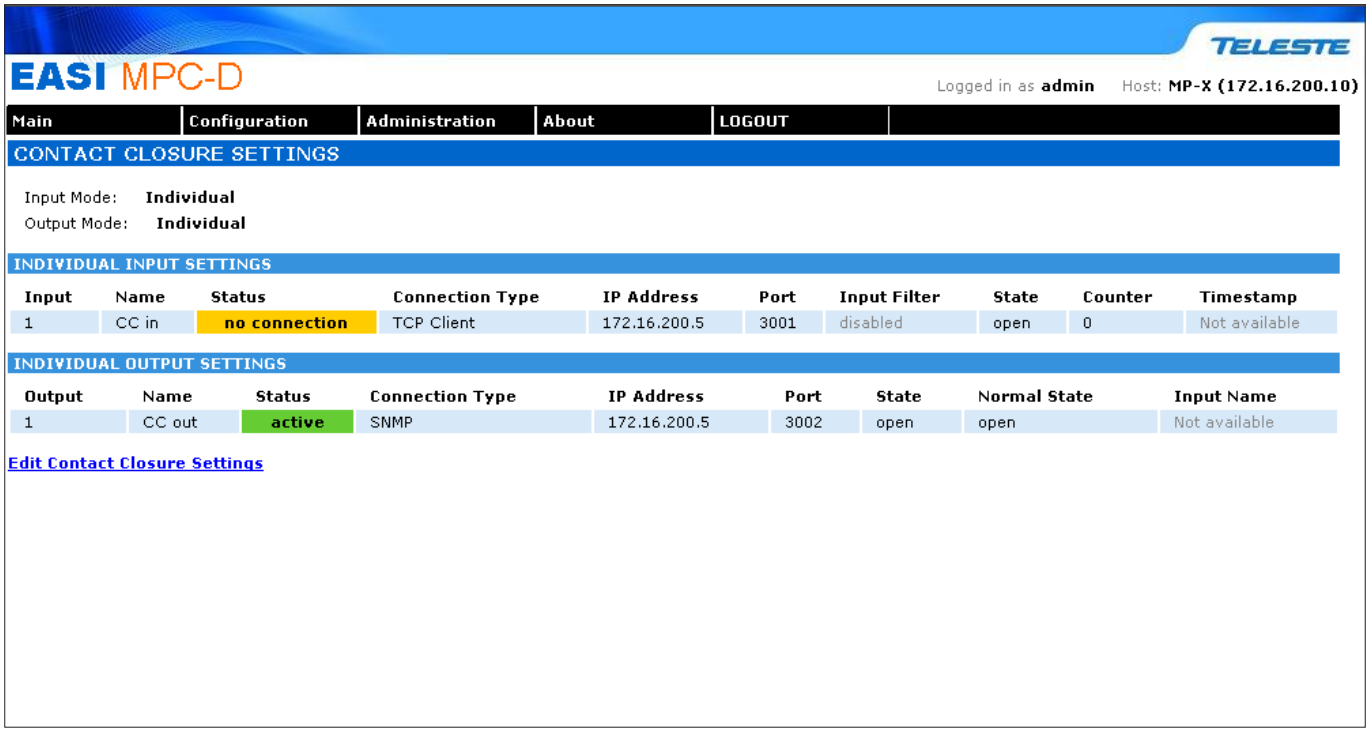
Click "**Edit SAP Settings**" menu under the SESSION ANNOUNCEMENT PROTOCOL SETTINGS heading. Session announcement protocol settings modify page appears on the screen. Device SAP settings can be changed on this page.

SAP Service: Service enabled / disabled.
Multicast TTL: Multicast Time-To-Live for SAP packets (1...255).
Announcement Interval (s): SAP timing in seconds (1...999). Retransmit time of SAP-packet. This time has to be same at both encoder and decoder pairs.
Administrative scope: Range of IP addresses meant to be advertised by SAP. The address used by SAP to advertise them will be the last one of the range.

Example: Video streams are multicasted to 239.0.1.x, where x is any value from 0-254.
- Administrative scope for SAP could be set then to 239.0.1.0 - 239.0.1.255, which covers all video streams.
- With these settings, the IP address used by SAP to advertise the video streams will be 239.0.1.255 (the last one of the range selected for SAP)

This method of SAP advertisement is useful to organize the advertisements. This way we can create isolated SAP advertisement channels. Receivers will listen to the SAP advertisement channel of their interest only.
- Encoder group #1 --> SAP administrative scope 239.0.1.0 - 239.0.1.255 --> SAP advertisement address: 239.0.1.255
- Encoder group #2 --> SAP administrative scope 239.0.2.0 - 239.0.2.255 --> SAP advertisement address: 239.0.2.255

- Decoder group #1 --> Interested only in encoder group #1 --> SAP advertisement address to listen to: 239.0.1.255 --> SAP administrative scope 239.0.1.0 - 239.0.1.255
- Decoder group #2 --> Interested only in encoder group #2 --> SAP advertisement address to listen to: 239.0.2.255 --> SAP administrative scope 239.0.2.0 - 239.0.2.255


EASI MPC-D
TELESTE
Logged in as admin Host: MP-X (172.16.200.10)
Main
Configuration
Administration
About
LOGOUT
CONTACT CLOSURE SETTINGS
Input Mode: Individual
Output Mode: Individual
INDIVIDUAL INPUT SETTINGS
Input Name Status Connection Type IP Address Port Input Filter State Counter Timestamp
1 CC in no connection TCP Client 172.16.200.5 3001 disabled open 0 Not available
INDIVIDUAL OUTPUT SETTINGS
Output Name Status Connection Type IP Address Port State Normal State Input Name
1 CC out active SNMP 172.16.200.5 3002 open open Not available
Edit Contact Closure Settings

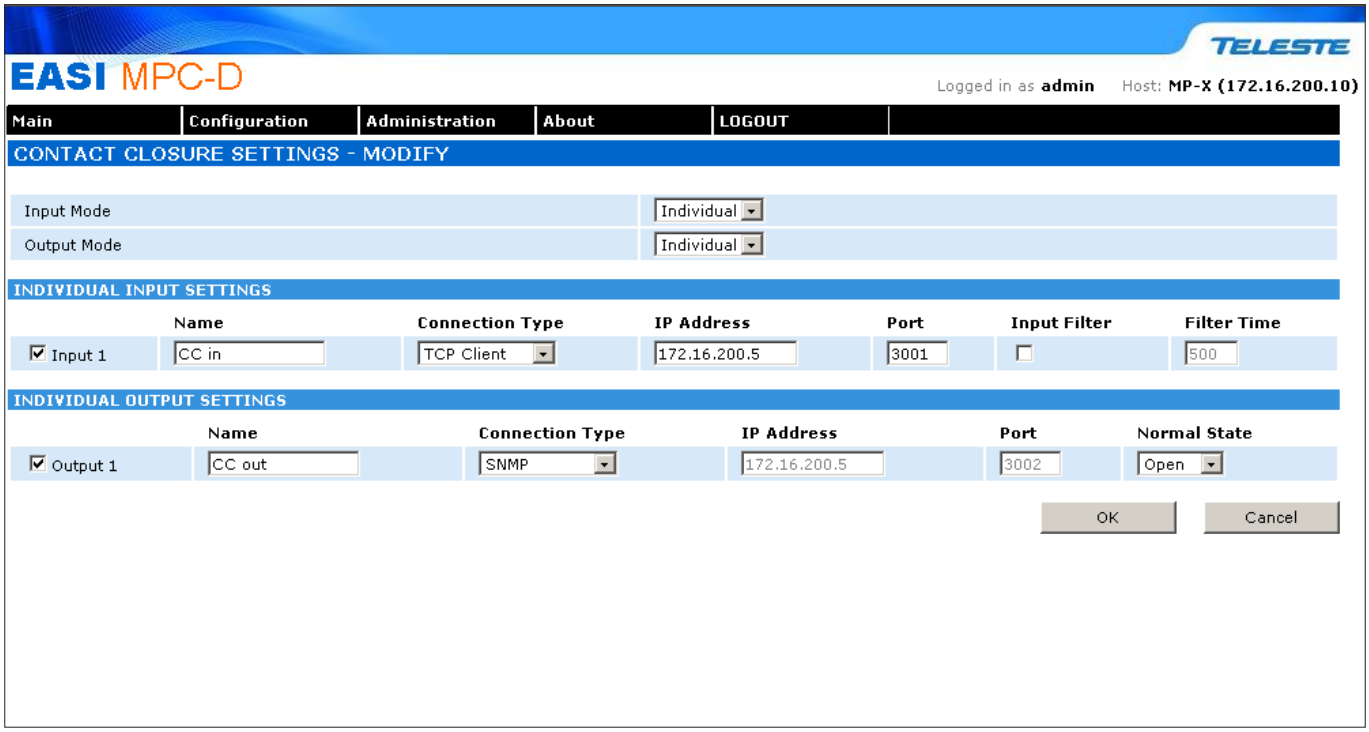
CONTACT CLOSURE SETTINGS

Click "**Contact Closure**" menu under the Configuration heading. Contact Closure settings page appears on the screen. This page shows device's contact closure settings.

Input/output Mode: CC mode, either disabled, individual or group

INDIVIDUAL INPUT/OUTPUT SETTINGS

Input/output: CC channel number.
Name: User definable alias name for CC interface.
Status: CC status, either active, disabled or no connection.
Connection Type: TCP client, TCP server, UDP multicast or SNMP.
IP address: Destination IP address.
Port: UDP/TCP port number.
Input Filter: If enabled, it shows "Filter Time" value in milliseconds.
State: Actual CC state. The possible values are "open", "closed" and "unstable" (this last one only if "Input Filter" feature is enabled).
Normal State: The default state for a given output CC.
Counter: Shows the total number of state changes that has been registered by a given input CC.
Time Stamp: Shows the date and time for the last state change.
Input name: Name of the remote input CC to which local output CC is connected.



CONTACT CLOSURE SETTINGS - MODIFY

Click "**Edit Contact Closure Settings**" menu under the CONTACT CLOSURE SETTINGS heading. Contact closure settings modify page appears on the screen. Device contact closure settings can be changed on this page.

Input/Output Mode

Individual: Each input/output is configured independiently and they work completely isolated from each other.

Group: All inputs/outputs share the same configuration and the status of all channels will be transmitted together.

Disabled: CC is disabled.

INDIVIDUAL INPUT/OUTPUT SETTINGS

Active: Only available when individual CC channels are in use. Set active when required CC channel (CC input/output) is taken in use.

Name: User definable alias name for CC interface (max 16 chars).

Connection Type: TCP client TCP server, UDP multicast or SNMP. If SNMP is selected, all settings will be configured and controlled via SNMP protocol remotely.

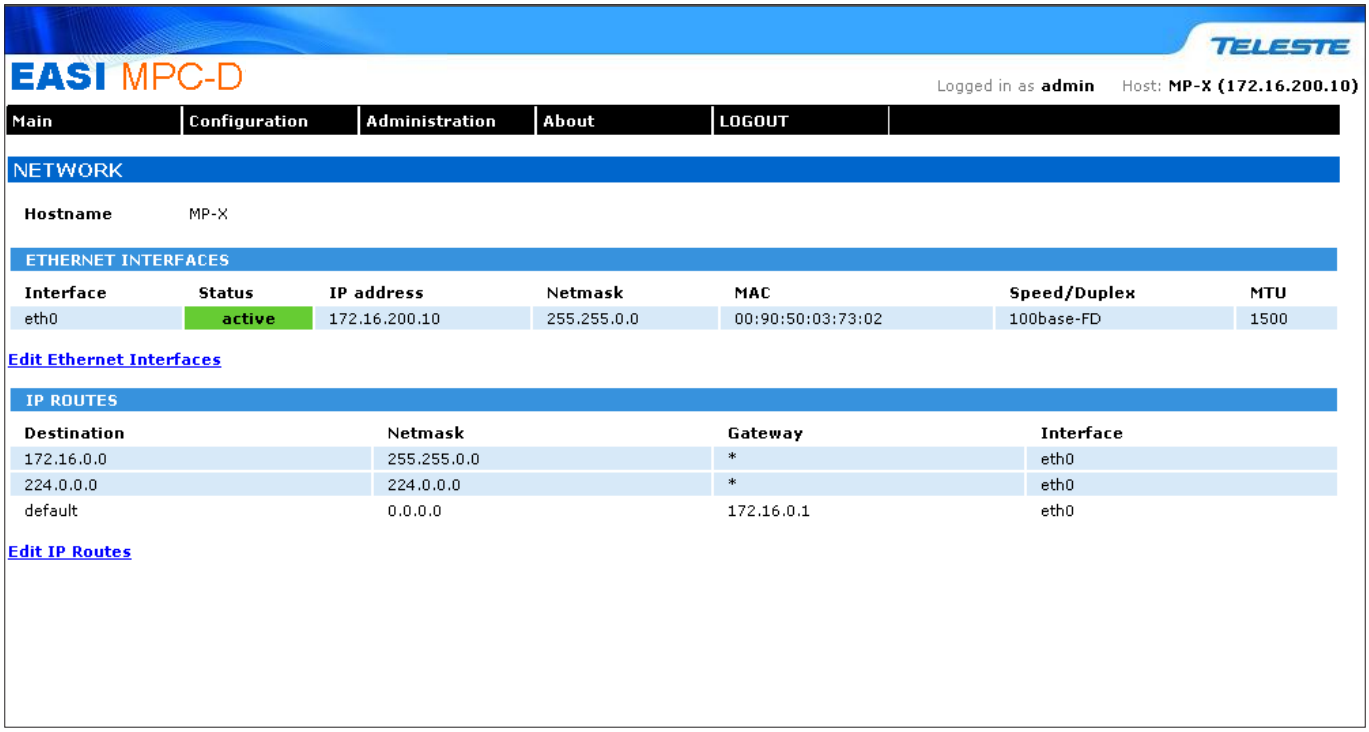
IP Address: Destination IP address.

Port: UDP/TCP port number (0...65535).

Input Filter: Monitors how many state changes happen (from close to open or vice versa) during the time frame given by "Filter Time" parameter. If during this time frame CC input state changes more than once, the input state is set as "unstable".

Filter Time: Time frame for "Input Filter" (100...2000 ms).

Normal State: The default state for a given CC output.



NETWORK

Click "**Network**" menu under the Administration heading. Network configuration page appears on the screen. This page shows device's network settings.

Hostname: Alias name for the device.

ETHERNET INTERFACES

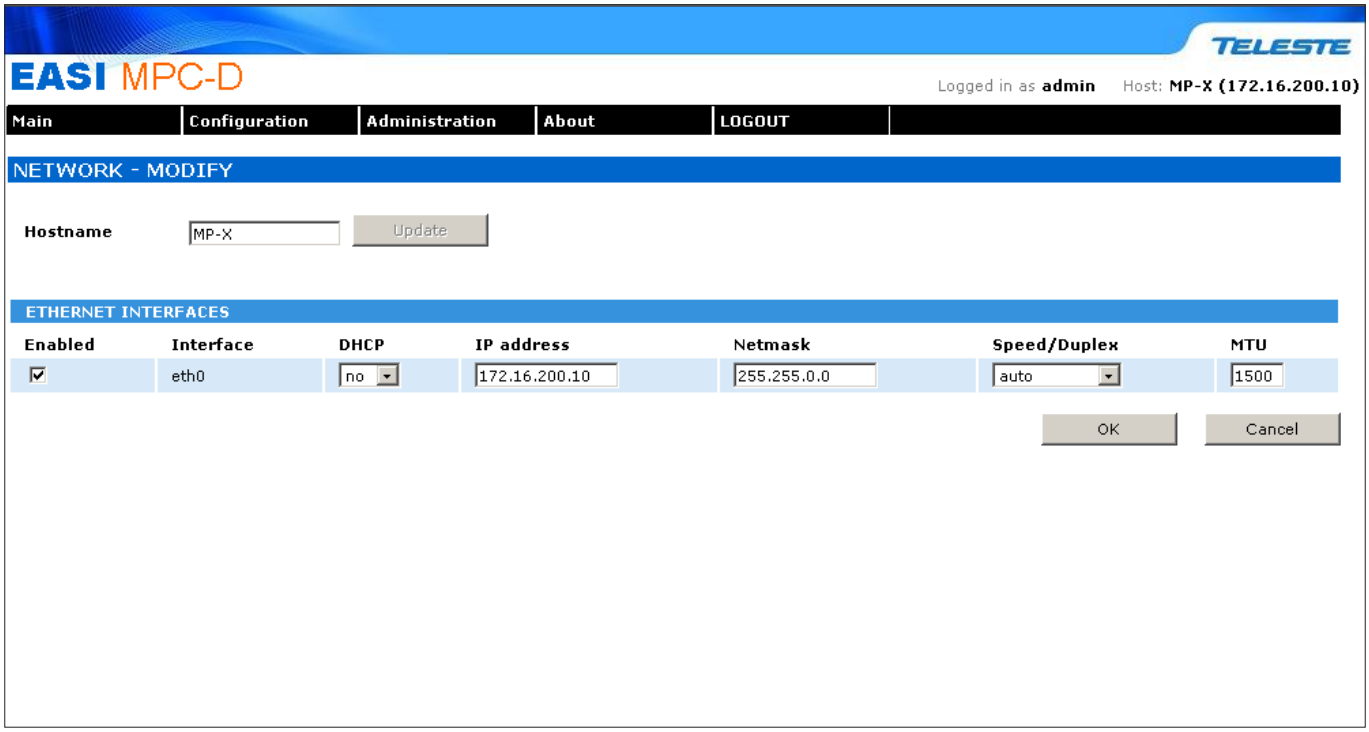
Interface: Interface name, eth0 = Ethernet port A, eth1 = Ethernet port B.
Status: Network status.
IP address: IP address of the device.
Netmask: Netmask address of the device.
MAC: MAC address of the device.
Speed/Duplex: Transmission parameters, network connection type and speed.
MTU: MTU (Maximum Transmission Unit) value.

IP ROUTES

IP Forwarding IP Forwarding
Destination: Destination IP address.
Netmask: Mask for subnet definition.
Gateway: Gateway address for router definition.
Gateway address is necessary for multicasting video. Device and gateway addresses should be in the same network.

***Note!** Gateway address should be set before enabling multicast video.*

Interface: Options are eth0 and eth1.



NETWORK - MODIFY

Click "**Edit Ethernet Interfaces**" menu under the Ethernet Interfaces heading. Network - modify /Ethernet interfaces page appears on the screen. Device Ethernet interface settings can be changed on this page.

Hostname: User definable alias name for the device.

ETHERNET INTERFACES

Enabled: Enables/disables Ethernet interface. Depending on the model, there is either one or two Ethernet ports available (eth0 = Ethernet port A and eth1 = Ethernet port B).

DHCP: DHCP client operation enabled/disabled. If enabled, the device gets its IP address from the DHCP server.

IP address: IP address of the device.

Note! *If this is changed, a new contact with the new IP address must be assigned to be able to continue with WebUI session.*

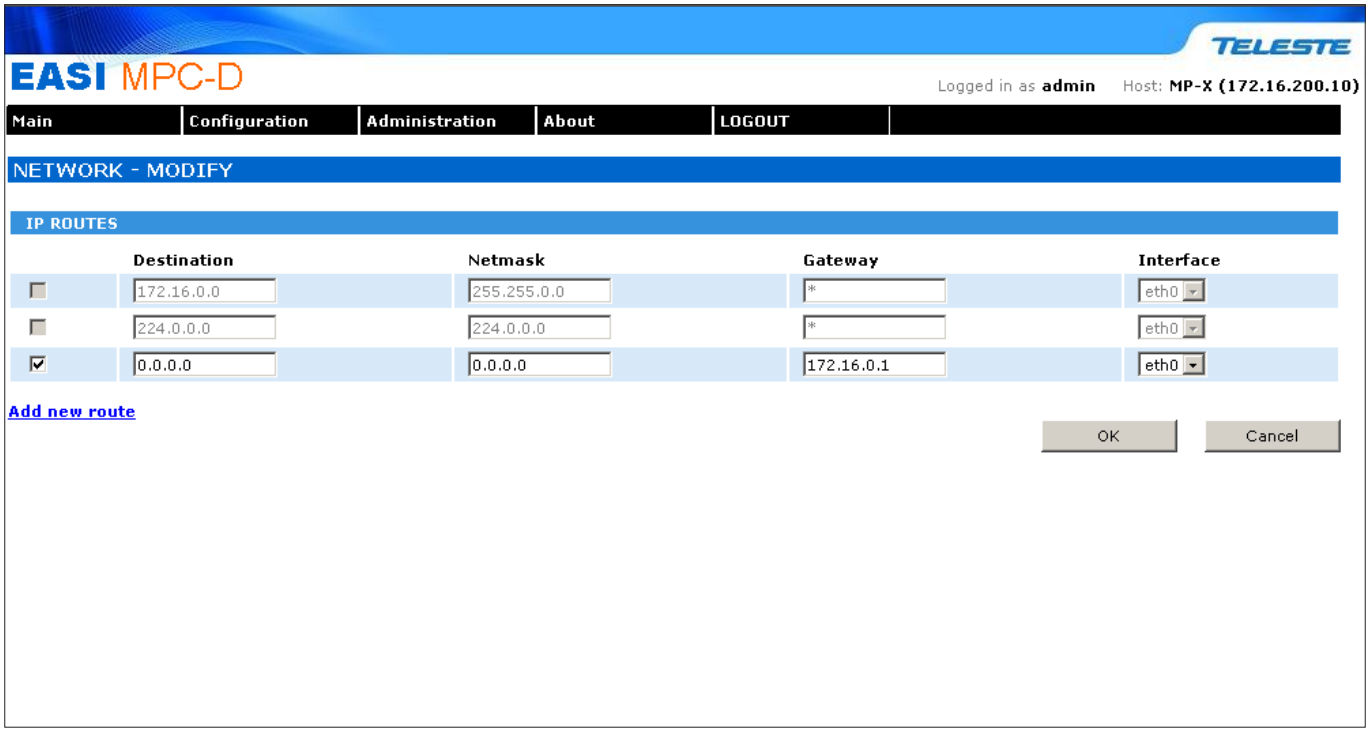
Netmask: Netmask address of the device.

Speed/Duplex: Transmission parameters, options are auto, 100base-FD, 100base-HD, 10base-FD and 10base-HF (FD = full duplex, HD = half duplex).

Note! *These parameters has to be same at both endocer and decoder pairs.*

MTU: MTU (Maximum Transmission Unit) value (max 1500).

Note! *Video packet will not go under 1200 bytes. All rest packets (data,...) will not go under 500 bytes.*



NETWORK - MODIFY

Click "**Edit IP Routes**" menu under the IP routes heading. Network - modify / IP routes page appears on the screen. Device network settings can be changed on this page

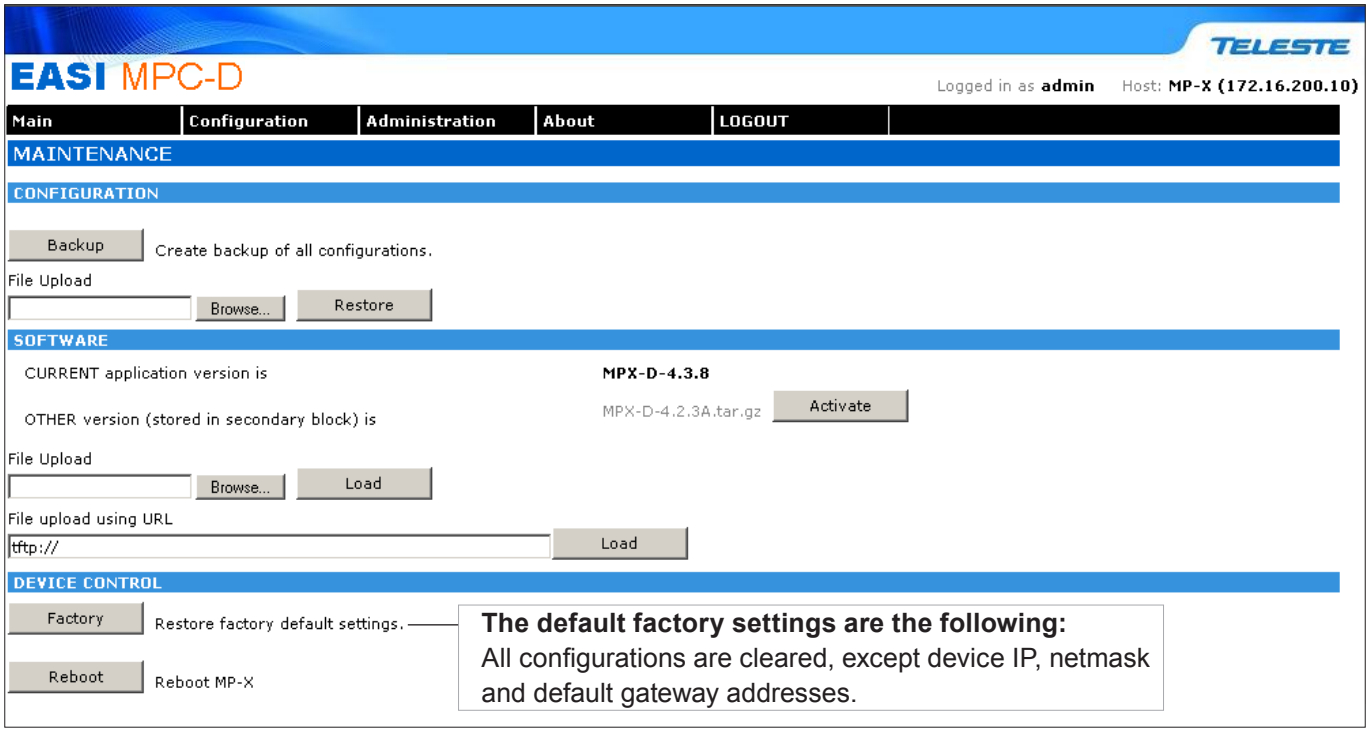
IP ROUTES

Destination: Destination IP address.
Netmask: Mask for subnet definition.
Gateway: Gateway address for router definition. Device and gateway addresses should be in the same network.

Note! *Gateway address should be set before enabling multicast video.*

Interface: Options are eth0 and eth1 (depends on device).

Click "**Add new route**" menu to add new routes.



MAINTENANCE

Click "**Maintenance**" menu under the Administration heading. Maintenance page appears on the screen. Device's firmware version can be updated and device configuration settings can be stored/ uploaded from this page.

CONFIGURATION

Click Backup button to store the current configuration to a file.

File Upload: Use this feature to upload the stored configuration file to the device. First find the stored configuration file and then press Restore button to upload and activate the configuration settings. Device restarts automatically after pressing Restore button.

SOFTWARE

CURRENT application version is: Current firmware version, e.g. **MPX-D-4.3.8.tar.gz**

OTHER version is Alternative (previous) firmware version. The alternative firmware version can be taken in use by clicking Activate button.

Note! *The MPX series decoder is capable of storing two firmware images, and can be operational during firmware update. The two partition approach provides also possibility to fall back to old firmware version, either automatically if the new firmware fails to run on the device or manually by the administrator.*

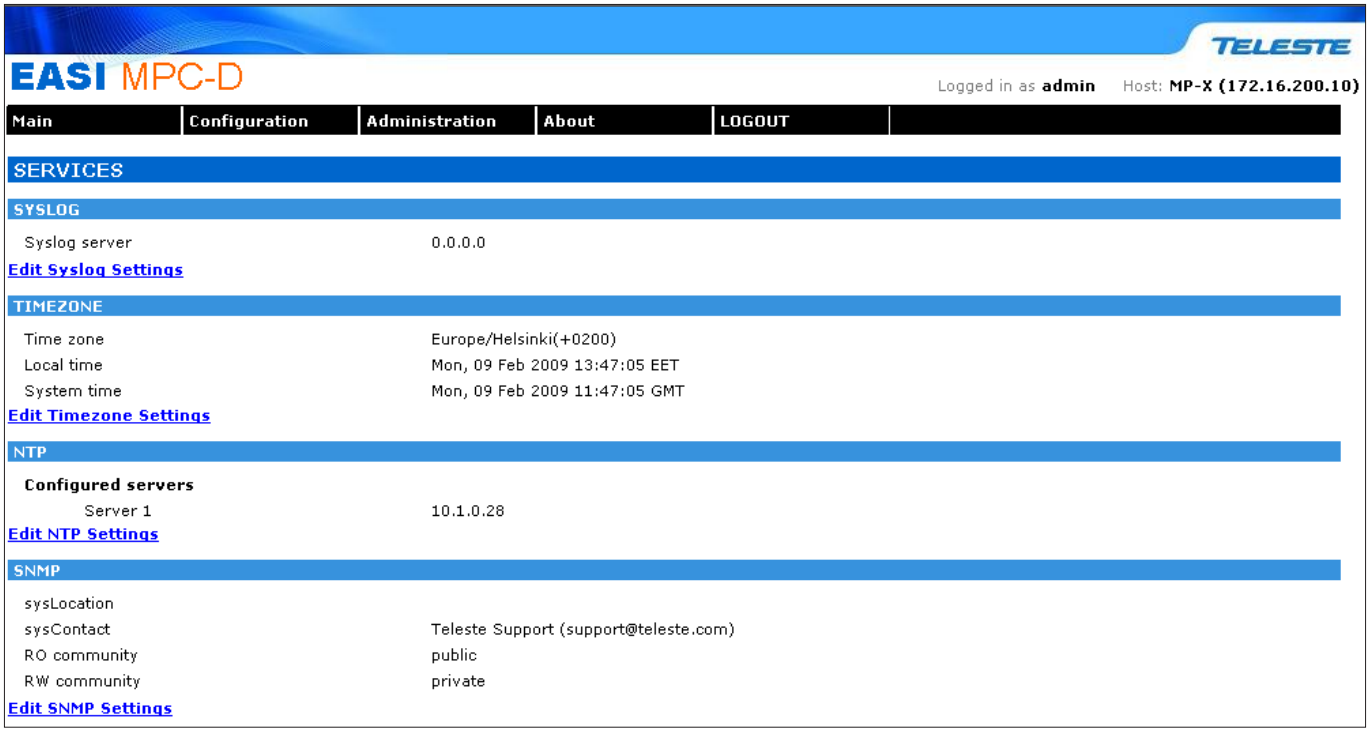
File Upload: Upload the new firmware version to the device.

DEVICE CONTROL

Note! *Factory default restoration does not change the network interface IP configuration.*

Click Factory button to restore default factory settings.

Click Reboot button to restart the device.



SERVICES

Click "**Services**" menu under the Administration heading. SERVICES page appears on the screen. This page shows device's syslog, timezone, NTP and SNMP settings.

SYSLOG

A Syslog server is a server, which stores log messages sent by "a remote unit" e.g. MPX series encoder. These messages include diagnosis data, e.g. reboots, NTP server status, stream operation.

Syslog server: Shows syslog server IP address.

Click **Edit Syslog Settings** menu to change the syslog server IP address.

TIMEZONE

Timezone: Selected time zone. Defines how conversion from system time (UTC) to local time is done. For user the local time is shown, for example in video text overlay timestamps. Conversion also takes daylight saving time in to account.

Local time: Shows local time.

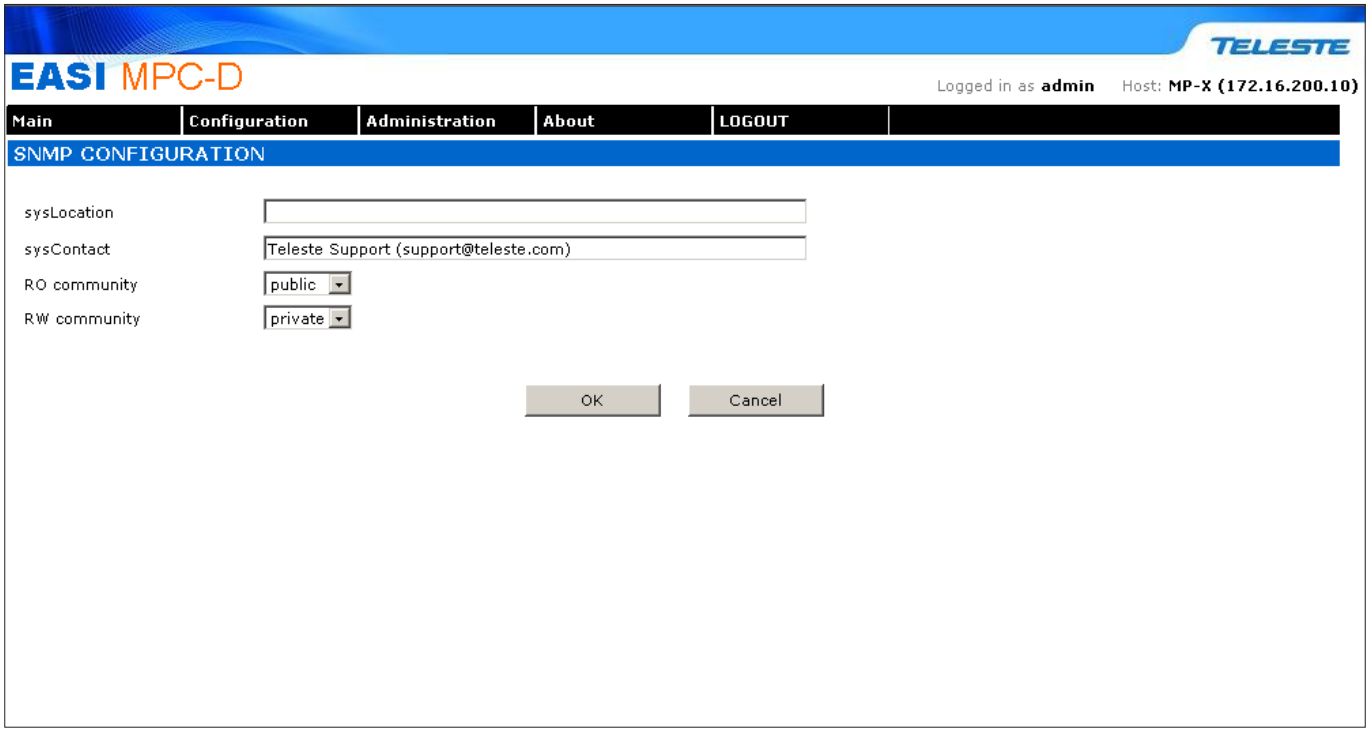
System time: Shows system time (allways in GMT).

Click **Edit Timezone Settings** menu to change the timezone.

NTP

Configured servers: Shows configured NTP (Network Time Protocol) servers.

Click **Edit NTP Settings** menu to change IP address of NTP server.



SNMP

Simple Network Management Protocol (SNMP) is the network protocol developed to manage devices on an IP network.

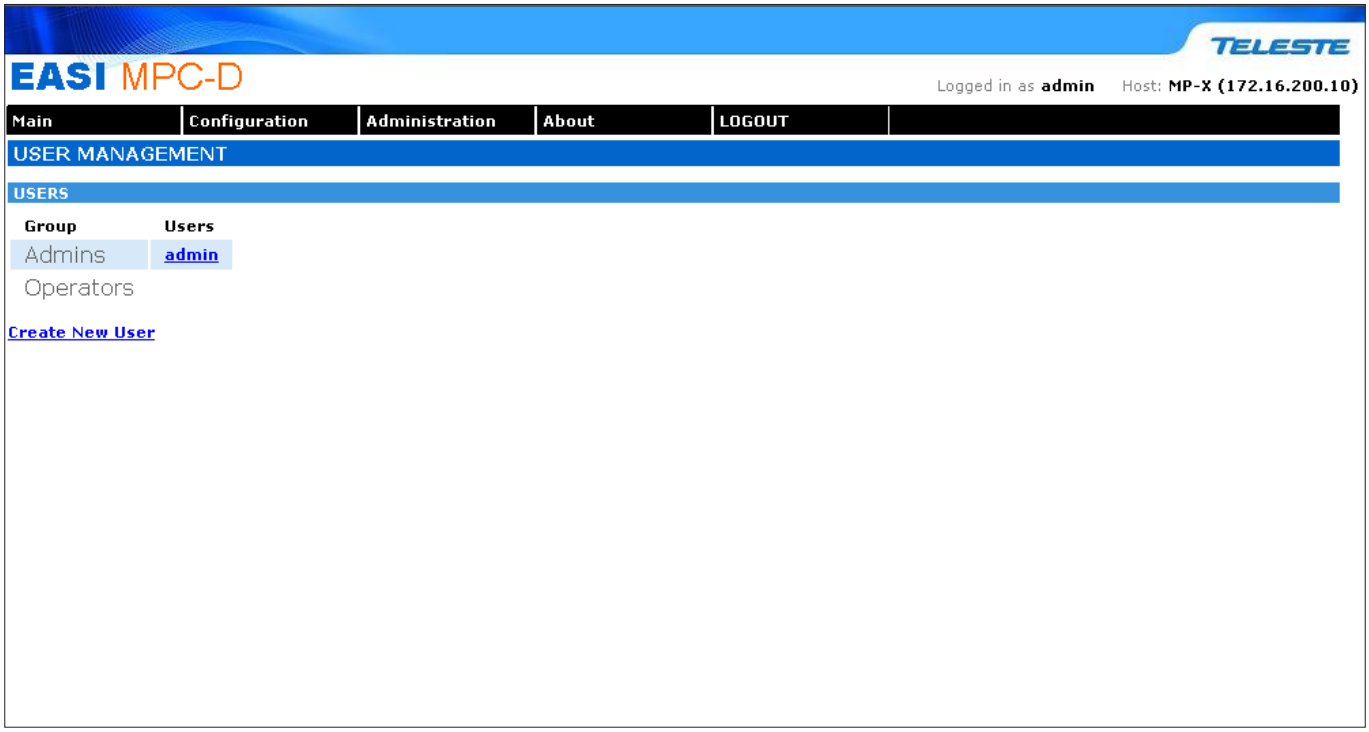
SysLocation: The sysLocation is used to define the location of the host on which the SNMP agent (server) is running.
Example: sysLocation 1st Floor of building, room 1.

SysContact: The sysContact is used to define the system contact address.
Example: sysContact Admin@email.address

RO community: Specifies the read only community (public or private).

RW community: Specifies the write community (public or private).

Click **Edit SNMP Settings** menu to change SNMP configuration.



USER MANAGEMENT

Click “**User management**” menu under the Administration heading. User management page appears on the screen. This page shows device’s users settings.

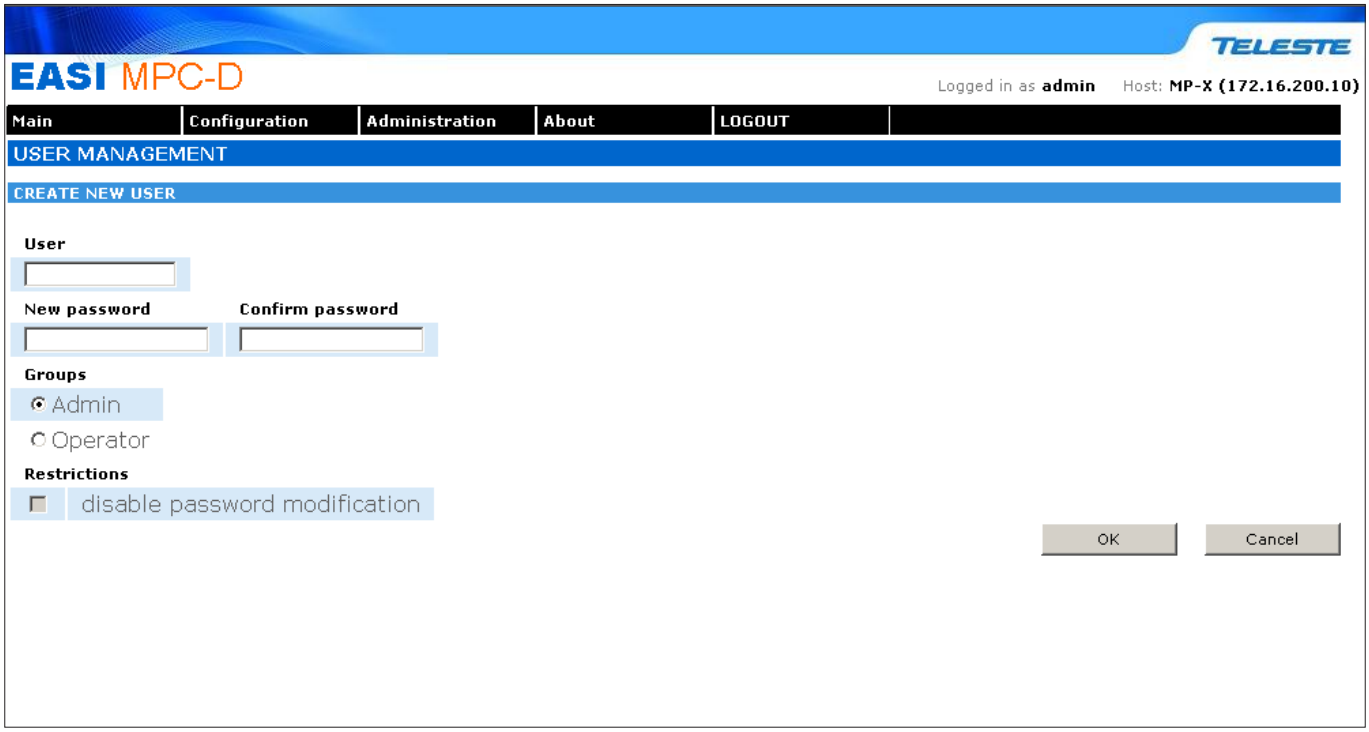
USERS

Group: Shows device user groups.
Admins are allowed to log on to decive and change all settings.
Users with Operators rights are allowed to log on to device and monitor the system, but they are not allowed to change the settings.

Users: Shows device user accounts.
All user accounts are protected by a user name and a password.
Default user name and password are:
Username: admin, Password: easix

Device administrators additionally can create, remove and edit user accounts, manage groups etc.

Click “Users account name” below the Users heading to modify user settings. Modify user settings page appears on the screen
User account, group and password can be removed/changed on this page.



USER MANAGEMENT

Click "**Create New User**" menu to add a new user.

CREATE NEW USER

User: Add a new user to the system.
New password: Enter the new password.
Confirm password Re-enter new password.
Groups: Select User groups. (Admin or Operator).
Restrictions: Enable/disable password modification.

Command Line Interface - CLI

General

The **MPX** series video decoder unit includes a command line interface (**CLI**) for configuration purposes. The CLI is a screen interface that allows the user to interact with the operating system by entering commands and optional arguments.
CLI is accessed through any terminal emulator application (e.g. **Hyper Terminal** or **PuTTY**). The command structure is the same for all session types.

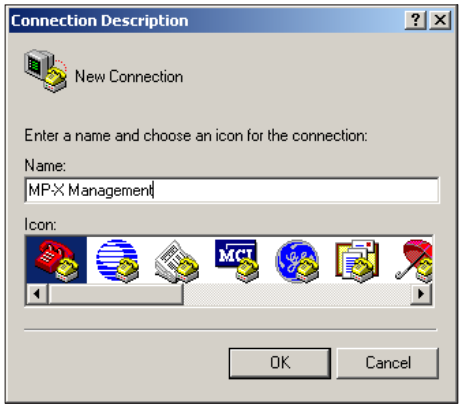
The CLI can be accessed in the following ways:
- Serial data connection (RS232), via **Mgmt** port, with a serial connection cable.
- TCP/IP connection, via active **Ethernet** port, with a Ethernet connection cable.

Note! *Telnet program does not support the SSH network protocol and therefore you can't use it for CLI.*

System requirements for CLI

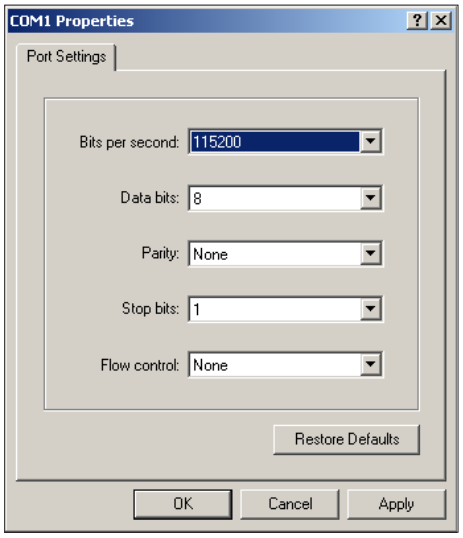
Connection through management (Mgmt) port **locally**:
* PC equipped with terminal emulator application supporting **VT100** / **102** or **ANSI** protocols, e.g. Hyper Terminal and PuTTY.
* **RS232**-cable (e.g. type Teleste **CIC504**).

Connection through Ethernet port **remotely**:
* PC equipped with terminal emulator application supporting Secure Shell (SSH) network protocol, e.g. PuTTY.
* **Ethernet** cable (e.g. type Teleste **OPUS1CAA0300X**).



Naming a terminal connection.

Selecting COM port.



Settings for COM port.

Connection methods - Serial connection

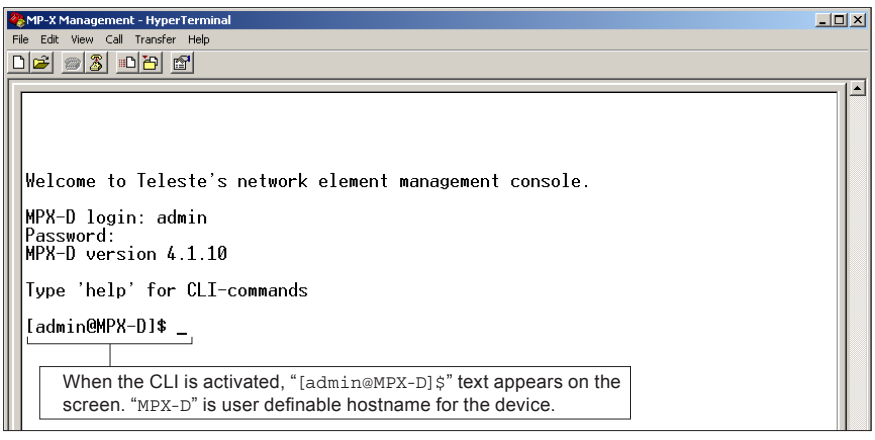
This chapter describes how to connect to CLI using Windows Hyper Terminal application.

1. Start the Windows Hyper Terminal application (in Windows by choosing -> Start/Programs/Accessories/Communications/Hyper Terminal). Wait until the following "**Connection Description**" window appears on the screen.
2. Enter a name for connection, e.g. "**MPX Management**" and click OK button to continue. The following "**Connect To**" window appears on the screen.
3. Choose **COM** port where the **management (RS232)** cable is connected, e.g. **COM1** port and click OK button to continue. The following "**COM1 Properties**" window appears on the screen. Set here the values as described in table below. Click OK button to continue. The "**MPX Management**" window appears on the screen.
4. To activate the terminal connection first press Enter --> "`login as:`" appears on the screen. Enter the required user name and the password (see section user groups, page 13). The "**MPX**" Hyper Terminal window appears on the screen. The terminal connection to **MPX** series video decoder device is now completed and you can now use the CLI commands to management the device.

The Hyper Terminal connection can be terminated by selecting File/Exit, Alt+F4 or clicking ✕ on the right upper corner of Hyper Terminal window.

Setting	Value
Emulation	VT100, VT102 or ANSI
Protocol	RS232 (serial)
Baud rate	115 200 kbps
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Port settings to terminal connection.

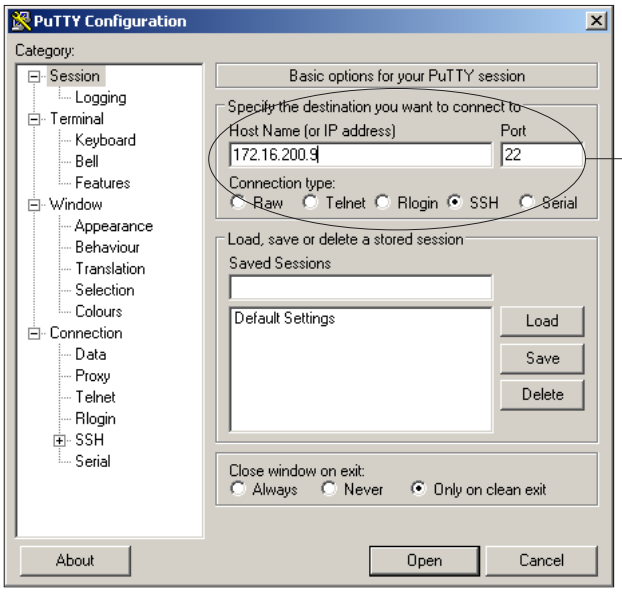

MPX Management - HyperTerminal
File Edit View Call Transfer Help
Welcome to Teleste's network element management console.
MPX-D login: admin
Password:
MPX-D version 4.1.10
Type 'help' for CLI-commands
[admin@MPX-D]$ _
When the CLI is activated, "[admin@MPX-D]$" text appears on the screen. "MPX-D" is user definable hostname for the device.

The Windows Hyper terminal application window view.

Connection methods - TCP/IP

This chapter describes how to connect to CLI using PuTTY application. (PuTTY is a client program for the SSH, Telnet and Rlogin network protocols). The same menus that are displayed on a local terminal are instantly available over an IP network.

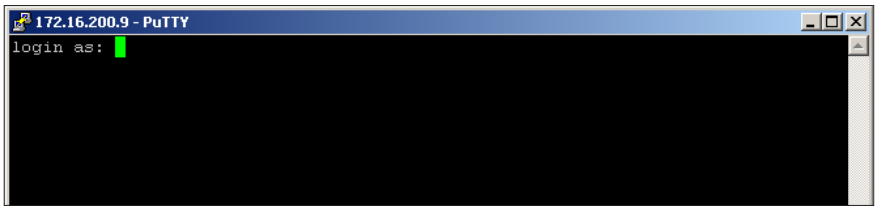
1. Start the **PuTTY** application. Wait until the following "**PuTTY Configuration**" window appears on the screen.



Required settings:
IP address
Port: 22
Connection type: SSH

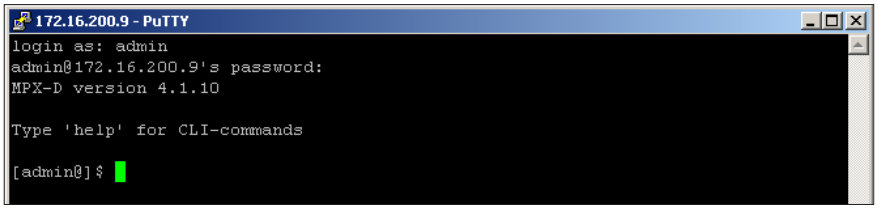
PuTTY application view (Windows XP).

2. Enter the device IP address into the "Host Name (or IP address") address bar and click Open button to continue.
   The following "**PuTTY**" window appears on the screen:



Telnet program view.

3. Enter the required user name and the password. The following "**172.16.200.9 - PuTTY**" window appears on the screen:



The **CLI** connection to **MPX** series video decoder is now completed and you can now use the **CLI** commands to management the device.

The **CLI** connection can be terminated by entering command **exit**.

Detailed descriptions of CLI commands

How to use the CLI

CLI consists of several commands. To execute the command, press **enter** after typing command. Entering **help** displays all valid commands. Entering **help** and **a command** displays further options of command. **Ctrl -C** is the interrupt key sequency and returns user to the prompt.

Note! *All letter must be typed as lowercase.*

```
[admin@MPX-D]$ help

Valid commands:

date                -> Date/time configuration
ipcfg               -> IP Configuration
ping                -> Test network connection
reboot              -> Reboot device
route               -> Route configuration
tftpswud            -> TFTP Software Update
uptime              -> Display uptime
appselect           -> Select active application
changelog           -> Print application changelog
passwd              -> Change password, only for current user
version             -> Print SW-version
eraseconf           -> Erase configuration
getconf <server>    -> Get configuration from tftp-server
putconf <server>    -> Put configuration into tftp-server
help                -> Print commands
help <command>      -> Help for command
exit                -> Exit CLI

[admin@MPX-D]$
```

Date command

Use the **date** command to change device date settings. Entering **help date** displays a list of options for **help** command.

```
[admin@MPX-D]$ help date
BusyBox v1.1.3 (2009.01.15-15:43+0000) multi-call binary

Usage: date [OPTION]... [MMDDhhmm[[CC]YY][.ss]] [+FORMAT]

Displays the current time in the given FORMAT, or sets the system date.

Options:
        -R              Outputs RFC-822 compliant date string
        -d STRING       Displays time described by STRING, not `now'
        -I[TIMESPEC]    Outputs an ISO-8601 compliant date/time string.
                        TIMESPEC=`date' (or missing) for date only,
                        `hours', `minutes', or `seconds' for date and,
                        time to the indicated precision.
        -s              Sets time described by STRING
        -r FILE         Displays the last modification time of FILE
        -u              Prints or sets Coordinated Universal Time

[admin@MPX-D]$
```

Ipcfg command

Use the **ipcfg** command to change device IP settings. Entering **help ipcfg** displays a list of options for **ipcfg** command.

ip usage example:

```
ipcfg ip 192.168.0.20
netmask 255.255.255.0
gw 192.168.0.1
```

Sets IP address, subnet mask and gateway for Ethernet interface.

```
[admin@MPX-D]$ help ipcfg
ipcfg [INTERFACE] OPTIONS

Interface:
  eth0/eth1             Configuring eth0 or eth1, eth0 is default
options:
  hostname NAME         Define a hostname, none=do not set hostname
  ip A.B.C.D            Define an IP address
  netmask A.B.C.D       Define a network mask
  gw A.B.C.D            Define a gateway address
  mtu value *           Define a interface MTU
  speed_duplex TYPE     Define a interface speed_duplex (10base-HD,
                        10base-FD, 100base-HD, 100base-FD, auto (default))
  bootproto NAME        Define bootproto settings
  status STATUS         Define interface up or down
  hostname              Display the hostname in config file
  ip                    Display the IP address in config file
  netmask               Display the network mask in config file
  gw                    Display the gateway address in config file
  bootproto             Display the bootproto settings in config file
  status                Display the interface status in config file

  -s                    Activate settings
  -v                    Display version information
  -S FILENAME           Execute script after applying IP parameters
[admin@MPX-D]$
```

* Strongly recommended not to change this value unless needed.

Ping command

Use the **ping** command to test is there a specific IP address accessible in network. Entering **help ping** displays a list of options for **ping** command.

```
[admin@MPX-D]$ help ping
BusyBox v1.1.3 (2009.01.15-15:43+0000) multi-call binary

Usage: ping [OPTION]... host

Send ICMP ECHO_REQUEST packets to network hosts.

Options:
        -c COUNT        Send only COUNT pings.
        -s SIZE         Send SIZE data bytes in packets (default=56).
        -q              Quiet mode, only displays output at start
                        and when finished.

[admin@MPX-D]$
```

Reboot command

Use the **reboot** command to restart the device. Entering **help reboot** displays a list of options for **reboot** command.

```
[admin@MPX-D]$ help reboot
BusyBox v1.1.3 (2009.01.15-15:43+0000) multi-call binary

Usage: reboot [-d<delay>]

Reboot the system.
Options:
        -d              delay interval for rebooting.

[admin@MPX-D]$
```

Route command

Use the **route** command to edit the kernel's routing tables. Entering **help route** displays a list of options for **route** command.

```
[admin@MPX-D]$ help route
BusyBox v1.1.3 (2009.01.15-15:43+0000) multi-call binary

Usage: route [{add|del|delete}]

Edit the kernel's routing tables.

Options:
        -n              Dont resolve names.
        -e              Display other/more information.
        -A inet         Select address family.

[admin@MPX-D]$
```

Tftpswud command

tftpswud usage example:

```
Tftpswud 4.3.8
192.168.0.100
```

Uploads the firmware image version number 4.3.8 from address 192.168.0.100.

The firmware filename is in the form MPX-D-4.3.8.tar.gz

Use the **tftpswud** command to change device's firmware. Entering **help tftpswud** displays a list of options for **tftpswud** command.

Note! *TFTP server must be installed, configured correctly and activated before using tftpswud command.*

```
[admin@MPX-D]$ help tftpswud
Usage: tftpswud <version number> <server ip>
or
tftpswud --url tftp://IP address/directory/MPX-D-4.3.x.bin
[admin@MPX-D]$
```

Uptime command

Use the **uptime** command to display the time since the last boot. Entering **help uptime** displays a list of options for **uptime** command.

```
[admin@MPX-D]$ help uptime
BusyBox v1.1.3 (2009.01.15-15:43+0000) multi-call binary

Usage: uptime

Display the time since the last boot.

[admin@MPX-D]$
```

Appselect command

Use the **appselect** command to display device's current application configuration. Entering **help appselect** displays a list of options for **appselect** command.

```
[admin@MPX-D]$ help appselect

Usage: appselect [application number]

This command prints current application configuration.
To select new application into use and reboot device, use command with
new application number.

Example: appselect 1     -> Application 1 will be activated and device
rebooted

[admin@MPX-D]$
```

Changelog command

Use the **changelog** command to display the changes for firmware. **Ctrl -c** is the interrupt key sequency and returns user to the prompt.

```
[admin@MPX-D]$ help changelog

Usage: changelog

Print application changelog. No options available.

[admin@MPX-D]$
```

Passwd command

Use the **passwd** command to change password for current user. Enter the new password (minimum of 5, maximum of 8 characters). Please use a combination of upper and lower case letters and numbers. Entering **help passwd** displays a list of options for **passwd** command.

```
[admin@MPX-D]$ help passwd

Usage: passwd

Change password for current user. No options available.

[admin@MPX-D]$
```

Version command

Use the **version** command to display the current firmware version of the device. Entering **help version** displays a list of options for **version** command.

```
[admin@MPX-D]$ help version

Usage: version

Print current software version. No options available.

[admin@MPX-D]$
```

Eraseconf command

Use the **eraseconf** command to erase device's current configuration to default settings. Entering **help eraseconf** displays a list of options for **eraseconf** command.

The default factory settings are the following:
All configurations are cleared, except device IP, netmask and default gateway addresses.

```
[admin@MPX-D]$ help eraseconf

Usage: eraseconf

This command will erase current configuration and reboot device.
Default settings will be loaded.

[admin@MPX-D]$
```

Getconf command

Use the **getconf** command to download stored configuration from TFTP - server. Entering **help getconf** displays a list of options for **getconf** command.

Note! *TFTP server must be installed, configured correctly and activated before using getconf command.*

```
[admin@MPX-D]$ help getconf

Usage: getconf [tftp-server ip]

This command will download configuration from tftp-server and reboot
device.

[admin@MPX-D]$
```

Putconf command

Use the **putconf** command to upload the current configuration to a TFTP - server. Entering **help putconf** displays a list of options for **putconf** command.

Note! *TFTP server must be installed, configured correctly and activated before using putconf command.*

```
[admin@MPX-D]$ help putconf

Usage: putconf [tftp-server ip]

This command will upload/transmit configuration to tftp-server.

[admin@MPX-D]$
```

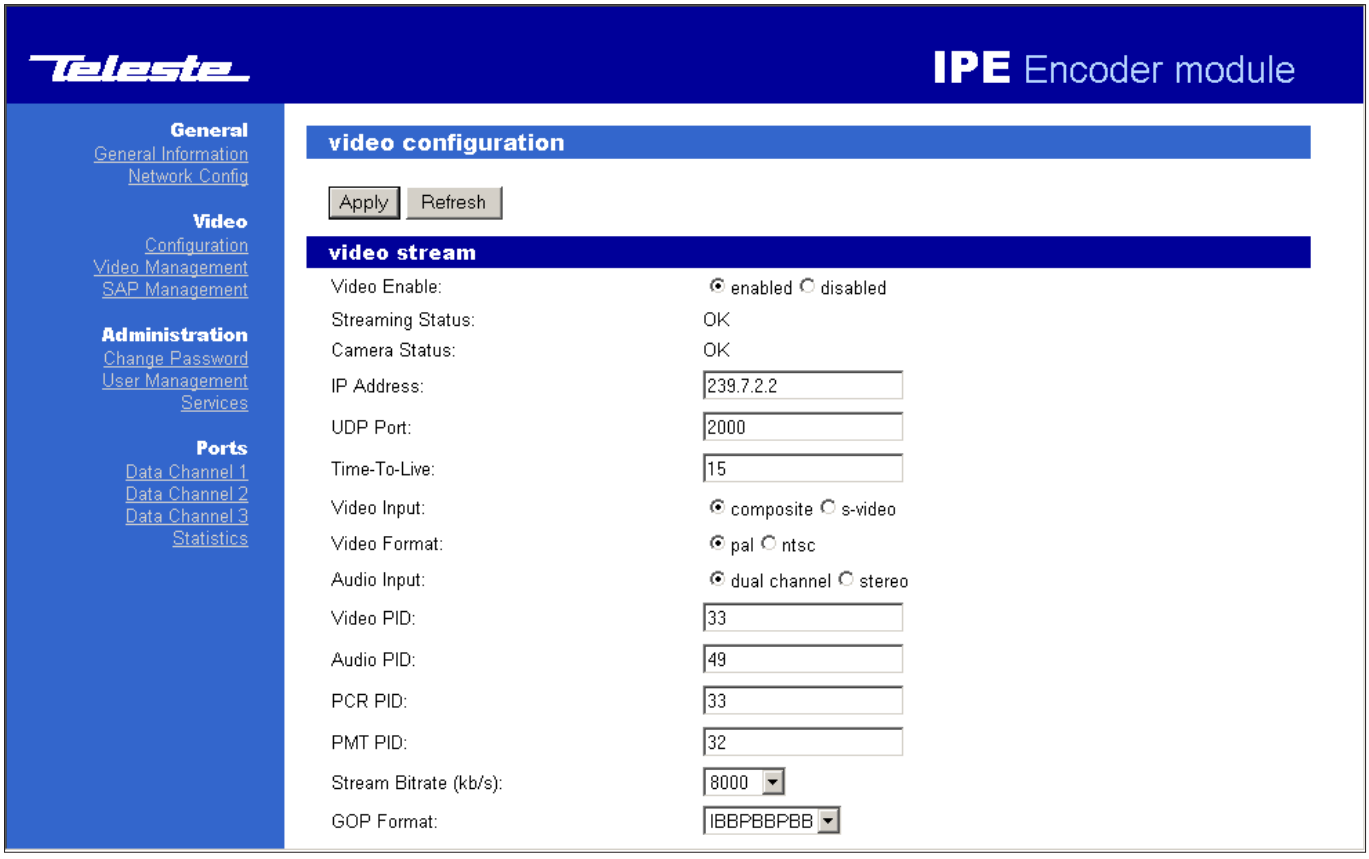
MPX and Easi IPE MPEG-2 encoder Interoperability

IPE ⟶ MPX-D

The MPX series decoders support MPEG-2 compressed video streams in addition to MPEG-4 from 4.1.x firmware release onwards.
The MPEG-2 decoder is interoperable with Teleste EASI IP family encoders (IPE).

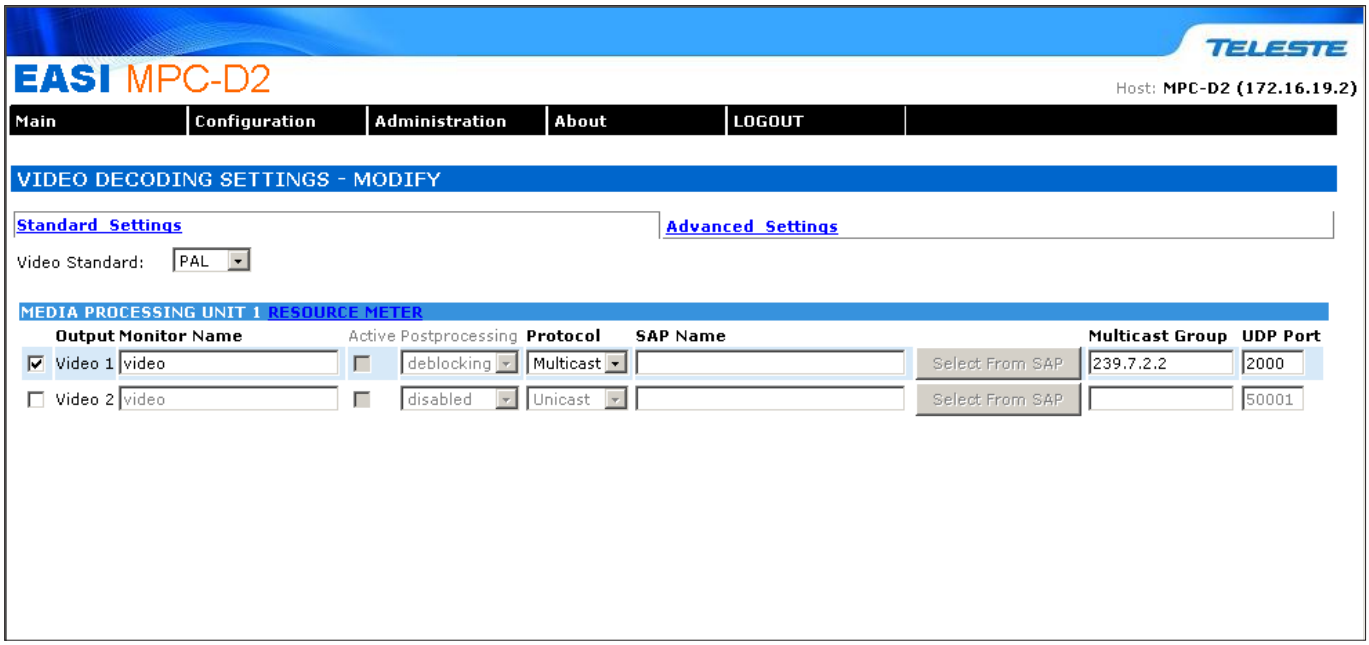
If the IPE is already configured, you can go directly to MPX decoder configuration.

Open the IPE Web interface and click **"Configuration"** under the Video menu. Set the desired parameters (Video input, format, stream bit rate and GOP) for the video. Next configure the IP address and UDP port number for the desired transport method; multicast or unicast. These parameters need to match with corresponding MPX decoder.



The MPX decoder is automatically detecting the used compression standard. Only parameters that need to be configured are **video standard** and **the IP address and port number**. Open the WebUI and click **"Video Decoding"** menu under the configuration menu. Next click the **"Edit Video Decoding Settings"** link. Select the video standard and activate the desired video output by enabling the checkbox. Configure the IP address and port number for the incoming video stream.

Note! *If you are using multicasting, please make sure that the gateway address is set and it is in the same network as the device itself. The multicast IP address and port number has to be the same in both encoder and decoder. In case of receiving unicast video, only the UDP port number needs to be defined.*



Example of video multicast configuration:

Encoder
IP address: **239.7.2.2**
UDP port: **2000**
Time-To-Live: **15**
Video Input: **composite**
Video Format: **pa**l
Video PID: **33**
Stream Bitrate (kb/s): **8000**
GOP Format: **IBBPBBPBB**

Decoder
IP address: **239.7.2.2**
UDP port: **2000**

Example of video unicast configuration:

Encoder
IP address: **172.16.19.2**
UDP port: **2000**

Decoder

UDP port: **2000**

Glossary

Bandwidth
The width of a communication channel, measured as frequency (hertz) or bits per second (bps).

Baudrate
The speed of information being transmitted across a serial interface, expressed in units of bits per second (bps).
For example, a baud rate of 9600 refers to bits being transmitted (or received) from one piece of equipment to another at a rate of 9600 bps. Thus, a seven bit ASCII character plus parity bit plus one stop bit (total nine bits) would be transmitted in 9/9600 sec. = 0.94 ms or about 1000 characters/sec. When communicating via a serial interface, the baud rate settings for two pieces of equipment must match.

Bit
A binary digit - either 0 or 1. Abbreviated b for bit or bits.

CBR (Constant Bit Rate)
A term that describes how video or audio is encoded. Constant bit rate means that the bit rate doesn't vary during the video or audio at all, but is same through the clip.

CIF - Common Intermediate Format
A commonly used television standard for measuring resolution. QCIF equals 176 x 120 pixels for NTSC and 176 x 144 pixels for PAL. CIF equals 352 x 240 pixels for NTSC and 352 x 288 pixels for PAL. 2IF equals 704 x 240 pixels for NTSC and 704 x 288 pixels for PAL. 4IF equals 704 x 480 pixels for NTSC and 704 x 576 pixels for PAL.

Client/Server
A model of computing in which a desktop client application has the necessary intelligence to access servers or hosts on the network to request information or perform queries about available resources.

Command Line Interface (CLI)
A text-based user interface. Allows the user to interact with the operating system by entering commands and optional arguments.

Ethernet
Specified in a standard, IEEE 802.3. 10BASE-T Ethernet systems provide transmission speeds up to 10 Mbps.
Fast Ethernet or 100BASE-T provides transmission speeds up to 100 megabits per second and is typically used for LAN backbone systems, supporting workstations with 10BASE-T cards. Gigabit Ethernet provides an even higher level of backbone support at 1000 megabits per second (1 gigabit or 1 billion bits per second).

Fast Ethernet
Also referred to as 100Base-Tand 100Base-X. Uses CSMA/CD access method at 100 Mbps; IEEE 802.3u; MII replaces AUI. Can use full duplex (200 Mbps). 100m limit for UTP implementation. Numerous wiring options: 100Base-TX, 100Base-T4, 100Base-FX; 4b5b/MLT-3 encoding.

Frame Rate
An attribute (relevant just for video mostly) which determines the video fluency. The TV transmission in Europe (PAL standard) has a frame rate of of 25 fps (or more exactly 50 fields per second). The frame rate in US (NTSC standard) is 30 fps.

Full Duplex
The ability to transmit and receive signals simultaneously.

Gateway
Gateways are points of entrance to and exit from a communications network. Viewed as a physical entity, a gateway is that node that translates between two otherwise incompatible networks or network segments.

Gigabit Ethernet
Informal name for emerging standard (IEEE 802.3z) CSMA/CD technology designed to provide 1Gbps network connectivity. Based on existing and evolving 802.3 standards, Gigabit Ethernet is expected to incorporate both halfand full-duplex operation, link-level flow control, VLAN support, and systems management. Support for one repeater per collision domain, backward compatibility with 10Base-T and 100Base-TX. New technologies introduced include packet bursting and carrier extension. For half-duplex devices carrier time and slot time are extended to 4096 bit times. Minimum packet length is same as existing Ethernet (64 B).

GUI (graphical useri Interface)
A GUI interface allows users to navigate and interact with information on their computer screen by using a mouse to "point," "click," and "drag" icons and other data around on the screen, instead of entering commands.

Half Duplex
The ability to transmit and receive signals in both directions, but only in one direction at a time.

Host
Any device on the network that implements communication above the Data Link Layer.

Hostname
A synonym for IP domain name, which typically takes the form host.

Hub
A physical layer device, generally used to serve at the center of a star-topology network. Hubs accept host, internetworking, and network management modules; and provide re-timing/repeater, bridging, and/or network management functionality. Ethernet 2 and IEEE 802.3 terminology, a hub is an Ethernet multi-port repeater, which sometimes referred to as a concentrator.

ICMP (Internet Control Message Protocol)
The Internet standard protocol (RFC 792) used to handle errors and control messages at the IP layer. ICMP is actually part of the IP protocol.

IGMP (Internet Group Multicast Protocol)
The Internet standard (RFC 1112) extensions to IP that support IP datagram multicasting to a “host group.” Membership in a host group is dynamic and there are no topological restrictions to participating in a host group. Hosts groups may be either permanent or transient. Host groups are identified by Class D IP addresses. There are three levels of conformance: 0: no support; 1: support for sending but not receiving; 2: full support.

IP (Internet Protocol)
Internet Protocol; the most important protocol of the Internet suite. IP allows information to traverse multiple networks worldwide. The network layer protocol (RFCs 760, 791) for the Internet protocol suite.

IP Switch
A device that forwards packets based soley upon destination IP addresses. The device does not necessarily speak any IP routing protocol(s) and does not perform routing or routing calculations. It learns the IP addresses of the attached devices by examining the IP source addresses. The device typically forwards at wire speed similar to a layer 2 switch (bridge), using cut-through rather than store and forward, but does so using layer 3 information instead.
Note that most IP switches are also layer 2 switches for other protocols; they may also process a limited selection of protocols other than IP at layer 3.

Latency
Measure of time, within a forwarding device, between receipt of the first bit of a packet on input and the generation of the first bit of the same packet forwarded on output.

Local Area Network (LAN)
A local area network is generally a private network. It is under the control of the owner and used by a set of related individuals and/or workgroups, typically within a single building or over a group of neighboring buildings. LANs are a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).
A local area network may serve as few as two or three users (for example, in a home network) or many as thousands of users (for example, in an FDDI network).

MAC (Media Access Control)
The protocol level that describes network management frames sent on the 802.5 token ring. Most MAC frames are handled transparently by the network adapter.

MAC Address
The unique physical (data link layer) address of an individual network interface. The standard specifies both 16- and 48-bit addresses. The 802.1 standards committee has defined a canonical format for writing and transmitting a MAC address. It is expressed as six octets separated by hyphens, each octet represented as twohexadecimal digits, least-significant bit first (littleendian). (As a matter of custom, non-canonical, most-significant bit first representation is given using colons as the octet separator.) For example, 08-00-20-85-e6-8d is a typical canonical MAC address. Within the MAC address are a number of fields of interest. The most significant (first) bit, known as the I/G bit (for Individual or Group) is 0 if the address represents an individual station; it is 1 if the address is a multicast (group or broadcast) address. The second bit, known as the U/L (for Universal or Local) bit is 0 if the address is globally administered and registered with the IEEE; it is 1 if it is a locally administered address.

MAC sublayer
Media Access Control sublayer. As defined by the IEEE, the lower portion of the OSI reference model data link layer. The MAC sublayer is concerned with media access issues, such as whether token passing or contention will be used.

Metropolitan Area Network (MAN)
A network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network (LAN) but smaller than the area covered by a wide area network (WAN). The term is applied to the interconnection of networks in a city into a single larger network (which may then also offer efficient connection to a wide area network). It is also used to mean the interconnection of several local area networks by bridging them with backbone lines. The latter usage is also sometimes referred to as a campus network.

MIB (Management Information Base)
A collection of objects (database) that can be accessed via a network management protocol. See SNMP and RFC 1066.

MIB-II (Management Information Base, Version 2)
The revised object definitions for Internet standard network management. Objects are defined using a subset of the Abstract Syntax Notation One (ASN.1).
See SNMP and RFC 1213.

MPEG (Moving Pictures Experts Group)
An ISO (International Standards Organization) group that sets standards for compressing and storing video, audio, and animation in digital form.

MPEG-1
Provides a video resolution of 352 by 240 at 30 frames per second (fps). This was designed to work at 1.2 Mbps.
Is meant for medium-bandwidth usage.

MPEG-2
Offers resolutions of 720 x 480 and 1280 x 720 at 60 fps, with data rates of between 1.2 and 15 Mbps, with full CD-quality audio. Is meant for high-bandwidth/broadband usage. This works for all the major TV standards, including NTSC and even HDTV.

MPEG-4
Designed specially for low-bandwidth (less than 1.5 Mbps bitrate) video/audio encoding purposes. Delivers video at comparable quality to MPEG1 at a much lower bit rate. Also supports a wide variety of elements that can be transmitted separately and combined to form the video frame, such as a talking head in one stream and the background in another. Allows manipulation of objects within the video stream (addition, subtraction, object manipulation, etc.).

Maximum transmission unit (MTU)
Refers to the size (in bytes) of the largest packet that a given layer of a communications protocol can pass onwards. A higher MTU brings higher bandwidth efficiency. However, large packets can block up a slow interface for some time, increasing the lag for further packets. For example, a 1500 byte packet, the largest allowed by Ethernet at the network layer (and hence most of the Internet), would tie up a 14.4k modem for about one second.

Multicast
Communication between a single sender and multiple receivers on a network. Streaming content can be sent multicast from one server to many users.

Multicast Address
An address that refers to multiple network devices. Synonymous with group address.

Multimode Fiber (MMF)
Optical fiber cable with a relatively wide core (62.5 µm or 50 µm) that allows multiple rays of light to follow different paths through the core.Termination is easier and cheaper, driven by optical diodes, good for short distances typically up to 2 km, more forgiving of termination errors.

Netmask
A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion. This is also sometimes referred to as the address mask or subnet mask.

Network
A group of stations (computers, telephones, or other devices) connected by communications facilities for exchanging information. Connection can be permanent, via cable, or temporary, through telephone or other communications links. The transmission medium can be physical (i.e. fiber optic cable) or wireless (i.e. satellite).

Network Address
The hostid 0 of an IP address is reserved; an IP address with the hostid zero is used to refer to the network itself.

Network Layer: OSI Layer 3
Provides upper layers with independence from the data transmission and switching technologies used to connect systems; responsible for establishing, maintaining, and terminating connections. Responsible for routing, switching, and subnetwork access across the entire OSI environment.

Network Time Protocol (NTP)
The standard network time synchronization protocol, can use UDP or TCP, but usually uses UDP, port 123. NTP is standardized in RFC 1305.

NTSC and PAL resolutions
In North America and Japan, the NTSC standard (National Television System Committee) is the predominant analog video standard, while in Europe the PAL standard (Phase Alternation by Line) is used. Both standards originate from the television industry. NTSC has a resolution of 480 horizontal lines, and a frame rate of 30 fps. PAL has a higher resolution with 576 horizontal lines, but a lower frame rate of 25 fps. The total amount of information per second is the same in both standards.

Packet
Generic term used to describe a contiguous unit of data with attached control information. Does not distinguish between frames and cells.

Parity
A data-checking technique, which uses an extra bit. If you send one extra-bit for each data bits to make sure your data got there intact, add and send one more bit - a parity bit. Bit parity could be odd or even. If it is even, you assign 0 to the parity bit in case when the sum of data bits is a even number and 1 if it is odd. It is odd, if the logics is reversed. After the data bits has arrived, the system will sum data bits and check if it matches the eve-or-oddness predicted by the parity byte.

Ping (Packet InterNet Groper)
Ping is a program that “bounces” a request off of another computer over a network to see if the remote computer is still responding. If the ping comes back, the remote computer is still alive.

Point-to-point
A virtual circuit, usually circuit switched, established between exactly two end points. End point technology is typically some bit serial interface, although a wide range of line capacity could be used.

Protocol
A formal description of messages to be exchanged and rules to be followed for two or more systems to exchange information.

QoS (Quality of Service)
Interactive video conferencing requires a high QoS. QOS is important as it determines the quality of your video call. Low quality of service results in latency and a jerky picture with poor and inconsistent audio quality.

Ring
A network topology in which all nodes are connected in a closed loop. Transmission is permitted by passing a token around the ring; a node copies out messages addressed to it and copies in messages addressed to others. Message receipt verification can also be performed with the token.

RMON (Remote Network Monitoring Management Information Base - RFC 1271)
An agent (embedded or stand-alone) that can continuously collect performance, fault, and configuration statistics, perform diagnostic operations, operate autonomously, generate management traps, and return collected data to a management station.

Router
On the Internet, a router is a device or, in some cases, software in a computer, that determines the next network point to which a packet should be forwarded toward its destination. The router is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to. A router is located at any gateway (where one network meets another), including each Internet point-of-presence. A router is often included as part of a network switch.

RTP (Real Time Protocol)
A wrapper around a real time stream of video or audio data. It is delivered usually via UDP. It is commonly used to transmit surveillance video. There are a great many formats supported within RTP framing. RFC 1889 describes the protocol.

SAP (Session Announcement Protocol)
SAP is a protocol that is used to assist the advertisement of multicast multimedia conferences and other multicast sessions, and to communicate the relevant session setup information to prospective participants.
RFC 2974 describes the protocol.

SSH (Secure Shell)
SSH is a protocol for creating a secure connection between two systems. Encryption provides confidentiality and integrity of data. SSH uses public-key cryptography to authenticate the remote computer and allow the remote computer to authenticate the user, if necessary.

Serial Communication Interfaces
- RS232 (single ended voltage signal)
- RS422 (differential voltage signal, single drop)
- RS485 (voltage signal, multidrop)
  duplex (4 wire), half-duplex (2 wire)

RS232 is the most common serial line interface. All personal computers have at least one RS232 serial port. RS232 is an unbalanced or single ended peer to peer Line Interface Standard. RS232 is ideal for connecting short distances less than 50 ft/15 meters. In general RS232 is limited to 100 kbps, but new technologies allow for baud rates over 1 Mbps along short distances of cable.
RS422 is used in situations where long distances are required. RS422 can drive up to 4000 ft/1220 meters at 100 kbps. Or short distance's over 1 Mbpps RS422 allows for one driver and up to ten receivers to be on a multi-dropped network or bus. RS422 is a differential or balanced Line Interface Standard.
RS485 is used in situations similar to where RS422 is used. RS485 has the added advantage of allowing up to thirty two (32) multi-dropped receivers or transmitters on a multi-dropped network or bus. Furthermore RS485 also permits a wire saving (1/2) duplex mode.

Server
A networked computer that contains public resources or services that can be accessed using software applications called "clients."

Simple Network Management Protocol (SNMP)
Primarily used to externally monitor the device. It can be also used by third party applications to change selected operational parameters, for example enable/disable video streams or adjust the bitrates.

Single-mode Fiber (SMF)
Optical fiber cable with a narrow core (8 to 9 µm) that allows light to travel along, only one path, driven by optical lasers. Used for long-distance signal transmission, typically up to 40 km.

Spanning Tree Protocol (STP)
A standard bridge protocol (IEEE 802.1d). This protocol allows bridges to dynamically discover a subset of the LAN topology that is loop-free and provides connectivity to all LAN segments.

Stop bit
In serial communications, where each bit of the message is transmitted in sequence, stop bits are extra "1" bits which follow the data and any parity bit. They mark the end of a unit of transmission (normally a byte or character).
For example, characters on an EIA-232 serial line may have one or two stop bits added. A serial connection may be described as, for example, "8N1" which means eight data bits, no parity and one stop bit.

Switch
An internetworking device (multiport bridge) that intelligently segments networks to increase overall bandwidth, isolate traffic and provides an interface to high-speed networks. The switch selects a path or circuit for sending a unit of data to its next destination. A switch may also include the function of the router, a device or program that can determine the route and specifically what adjacent network point the data should be sent to. In general, a switch is a simpler and faster mechanism than a router, which requires knowledge about the network and how to determine the route.

Syslog
A simple UDP protocol. Used for capture client debug output sessions in a real-time scenario. Syslog usually uses UDP port 514.

TCP/IP (Transmission Control Protocol/Internet Protocol)
The basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet).
When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

Telnet ("Terminal Emulation")
A terminal emulation program for TCP/IP networks that enables you to log in to other computer systems on the network.

Terminal
Computer terminal; a device that is able to communicate (usually asynchronously) with a host computer.

Time to Live (TTL)
A value in an Internet Protocol (IP) packet that tells a network router whether or not the packet has been in the network too long and should be discarded.

Transport Stream
A multiplex of several program streams that are carried in packets. Demultiplexing is achieved by different packet IDs (PIDs). See PSI, PAT, PMT, and PCR.

UDP (User Datagram Protocol)
A connectionless transport layer protocol in the TCP/IP protocol stack (RFC 768). UDP is a simple protocol that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols.

Unicast
Communication between a single sender and a single receiver on a network. Streaming content can be sent unicast from one server to one user. Compare with Multicast.

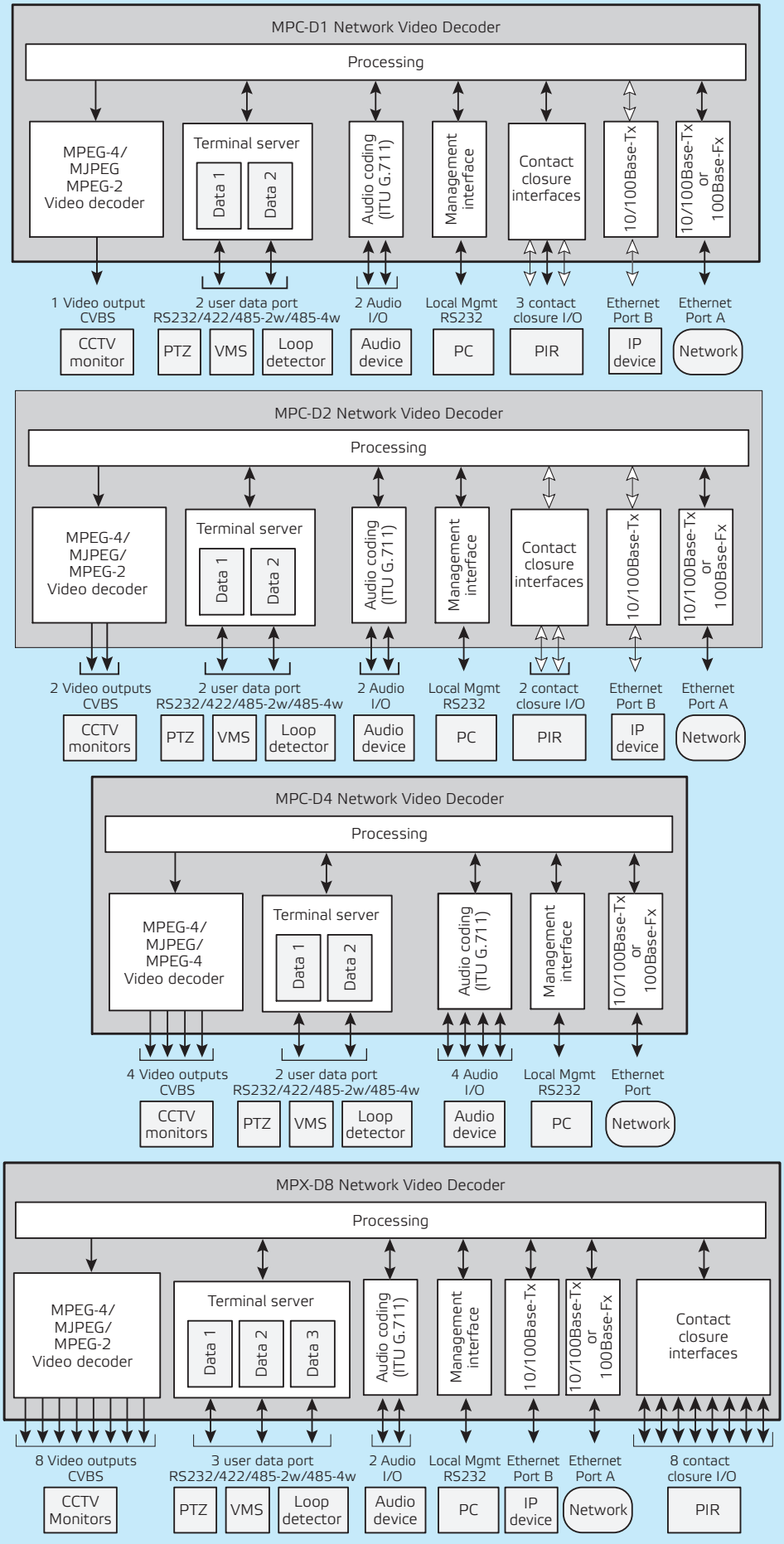
VBR (Variable Bit Rate)
A term that describes how video or audio is encoded. Variable bit rate provides a specified throughput capacity but data is not sent evenly.

Videoconferencing
Communication across long distances with video and audio contact that may also include graphics and data exchange. Digital video transmission systems typically consist of camera, codec (Encoder-Encoder), network access equipment, network, and audio system, e.g. EASI® BLUEbox devices.

VLAN (Virtual LAN)
Network configuration, emulating a broadcast domain, where stations communicate using LAN protocols as if they were on the same LAN, but where they are actually on multiple segments connected through layers 1, 2, and/or 3.

Wide Area Network (WAN)
A geographically dispersed telecommunications network. The term distinguishes a broader telecommunication structure from a local area network (LAN). A wide area network connects local area networks to one another, generally using public infrastructure or services. The connections are made using the shared public infrastructure, public infrastructure leased for private use, and sometimes, private infrastructure (e.g., fiber) with public services.

Block Diagrams



Technical Specifications

Video		
Number of outputs	1/2/4 CVBS (PAL/NTSC)	MPX-D1/D2/D4
	8 CVBS (PAL/NTSC)	MPX-D8
Nominal level	1.0 Vpp	75 ohms
Decoding	ISO/IEC14496-2	MPEG-4@SP L5
	ISO/IEC13818-2	MJPEG
	ISO/IEC 13818	MPEG-2 MP@ML
Resolution	QCIF, CIF, 2CIF, 4CIF, ½D1, D1	MPEG-4, MPEG-2
	QCIF, CIF, 2CIF, 4CIF	MJPEG
Frame rate	1...25 fps PAL,	
	1...30 fps NTSC	MPEG-4, MJPEG
	25 fps PAL, 30 fps NTSC	MPEG-2
Input bit rate	up to 8 Mbps	MPEG-4
	up to 8 Mbps	MJPEG
	up to 10 Mbps	MPEG-2
Transport	RTP/UDP/IP	
	multicast and unicast	MPEG-4
	RTP/UDP	MJPEG
	TS/UDP/IP, ES/UDP/IP,	
	ES/RTP/UDP/IP	MPEG-2
Latency	< 150 ms	encoding - decoding
Connectors	BNC female	

Audio		
Number of channels	2 bi-directional, unbalanced	MPX-D1, MPX-D2
	4 bi-directional, unbalanced	MPX-D4
	8 bi-directional, unbalanced	MPX-D8
Nominal level (RMS)	0.775 V	0 dBm
Impedance	> 10k ohm	input
	< 50 ohm	output
Coding	ITU G.711	u-law
Sampling rate	8 / 32 kHz	selectable
Data rate	64 / 256 kbps	per channel
Transport	RTP/UDP/IP	multicast and unicast
Connectors	RJ-45 female	

Data		
Number of channels	2 full duplex	MPC
	3 full duplex	MPX
Standard	EIA RS232/422/485	selectable
Bit rate	1.2...115.2 kbps	standard speeds
Format	asynchronous	standard framings
Transport	TCP/IP unicast or UDP/IP multicast	selectable
Connectors	RJ-45 female	

Contact Closure *		
Number of channels *	1/2/3 bi-directional	MPC
	8 bi-directional	MPX
Input *	dry contact	short circuit
	opto-isolated	5V DC / 20mA (max.)
Output	24V / 1A (relay)	max.
Control delay	< 20 ms	
Connectors	4-pin removable screw terminal	MPC
	8-pin removable screw terminal	MPX

Ethernet Interface		
Number of ports	1/2* (port A & B*)	MPX-D1, MPX-D2
	1	MPX-D4
	2 (port A & B)	MPX-D8
Port A standard *	10/100Base-Tx/100Base-Fx	SFP optics support
Port B standard	10/100Base-Tx	fixed
Connector	RJ-45 female	10/100Base-Tx

Ethernet Protocols	
Video/Audio/Data	RTP, UDP, TCP, IP, SAP
Management	SNMPv2, HTTP, DHCP, SSH, SSL, Telnet
Generic	ICMP, IGMPv3, ARP, NTP, FTP

SFP Optics *		
MMF 1310 nm	2 km	2 fibres
SMF 1310 nm	30 / 60 km	2 fibres
SMF 1550 nm	20 / 100 / 120 km	2 fibres
CWDM (ITU G.694.2)	100 km	2 fibres
BIDI SMF 1310/1550 nm	25 / 60 km	1 fibre
Connector	LC	100Base-Fx

Management	
WebUI	local via Ethernet port, remote via network
SNMP	remote via network
CLI	local via management port, remote via SSH
Software update	local or remote
Status indicators	front panel leds

General		
Supply voltage	10.5...25 V DC	
Power consumption	4.6 W	MPX-D1, MPX-D2
	6.6 W	MPX-D4
	16 W	MPX-D8
PSU connector	2-pin removable screw terminal	MPC
	4-pin removable screw terminal	MPX
Dimensions (H x W x D)	60 • 130 • 130 mm (2.4 • 5.1 • 5.1”)	MPC
	80 • 130 • 130 mm (3.1 • 5.1 • 5.1”)	MPC
	1U • 19” • 236 mm (1U • 19” • 9.3”)	MPX
Weight	1.0 kg (2.2 lb), 1.3 kg (2.9 lb)	MPC
	3.5 kg (7.7 lb)	MPX
Housing	Stand-alone, DIN-rail mount *	MPC
	Stand-alone, rack-mount	MPX
MTBF	> 150.000 h, HRD5	MPC
	> 110.000 h, HRD5	MPX
Operating temperature	-34...+74 °C (-29...+165 °F)	temperature hardened
Storage temperature	-40...+80 °C (-40...+176 °F)	
EMC compatibility	EN61000-6-3**, EN50130-4, CE, FCC	
	EN50121-4:2006	MPX-D8
Environmental	IEC60068-2-1:1990 + A1:1993 + A2:1994	
	IEC60068-2-2:1974 + A1:1993 + A2:1995	

Accessories ***		
Management cable	CIC504	D9, 2.0 m
Audio cable	CIC401	4 x RCA male, 3.0 m
Data cable	CIC603	open wires, 2.5 m
Power Supply	CPS241/242/243	12 VDC 3.3 A

Notes

* *optional*

** *This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.*

*** *ordered separately*

Typical values unless otherwise stated

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WEEE directive

Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) obliges that producers appropriately mark electrical and electronic equipment with the symbol indicating separate collection. This obligation applies to the equipment put on the market in EU after 13 August 2005.

Teleste devices which belong to the scope of the directive have been marked with the separate collection symbol shown below. The marking is according to the standard EN 50419. The symbol indicates that the device has to be collected and treated separately from unsorted municipal waste.

User manual revision history note:
The latest version is always available in pdf-format on our web site:
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TELESTE

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